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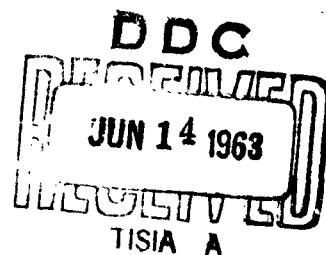
The Vridi Canal
View looking south from the Petroleum

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THE PORT OF ABIDJAN: AN IMPORTANT FACTOR
IN THE ECONOMIC DEVELOPMENT
OF THE IVORY COAST

by

Richard J. Peterec



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Richard J. Peterec
Department of Geology and Geography
Bucknell University

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Division of Economic Geography
Columbia University
New York 27, New York

TABLE OF CONTENTS

	Page
Introduction	1
Historical Development	4
Port Development in the Ivory Coast	7
The Site of the Port of Abidjan	13
The Vridi Canal	16
Port Facilities	19
Traffic at the Port of Abidjan	24
The City of Abidjan and its Industrial Complex	30
Transportation Links With the Interior	33
The Hinterland Behind the Port of Abidjan	40
The Humid Equatorial Hinterland	42
The Savanna Hinterland	52
The Mineral Hinterland	56
Secondary Ports of the Ivory Coast	57
Conclusion	60

THE PORT OF ABIDJAN: AN IMPORTANT FACTOR
IN THE ECONOMIC DEVELOPMENT OF THE IVORY COAST¹

Born in 1950 as the product of necessity rather than convenience, the port of Abidjan has, in the following decade, experienced a remarkable growth, a growth parallel to that of the general economy of the Ivory Coast, to which it in turn has been a principal contributor. Originally conceived as the most important ocean outlet for the Ivory Coast and Upper Volta, with an annual total traffic of approximately 650,000 tons of miscellaneous cargo, the port of Abidjan quickly went on to exceed this figure, surpassing it in 1961 by over 250 per cent. In that year, debarkations at the port (essentially processed and manufactured goods) amounted to 1,057,539 tons, while converse movements (primarily wood, coffee, cacao, bananas, peanuts, and manganese ore) totaled 1,320,827 tons.² This total figure of 2,378,366 tons is all the more remarkable when one realizes that, unlike the port of Dakar, it was achieved almost entirely without the aid of bunkering manipulations.

¹ This article is one of a series of studies prepared under a Columbia University contract with the Office of Naval Research on port terminals, transport routes, and trade movements of tropical Africa and Madagascar. The author wishes to sincerely thank Professor William A. Hance, Mrs. Irene S. van Dongen, the Office of Naval Research, and the many people in the United States and Africa who provided guidance, information, and assistance to make this project possible.

² These figures, including most of the peanut embarkations, include approximately 90 per cent of the overseas trade of the Mali Republic, whose traditional and most economical overseas trade route via the railroad to the port of Dakar in Senegal was severed temporarily in August 1960. In 1961, the overseas trade of Mali accounted for approximately 150,000 tons of cargo passing through the port of Abidjan. However, the Dakar-Bamako rail line is expected to be reopened by the end of 1963.

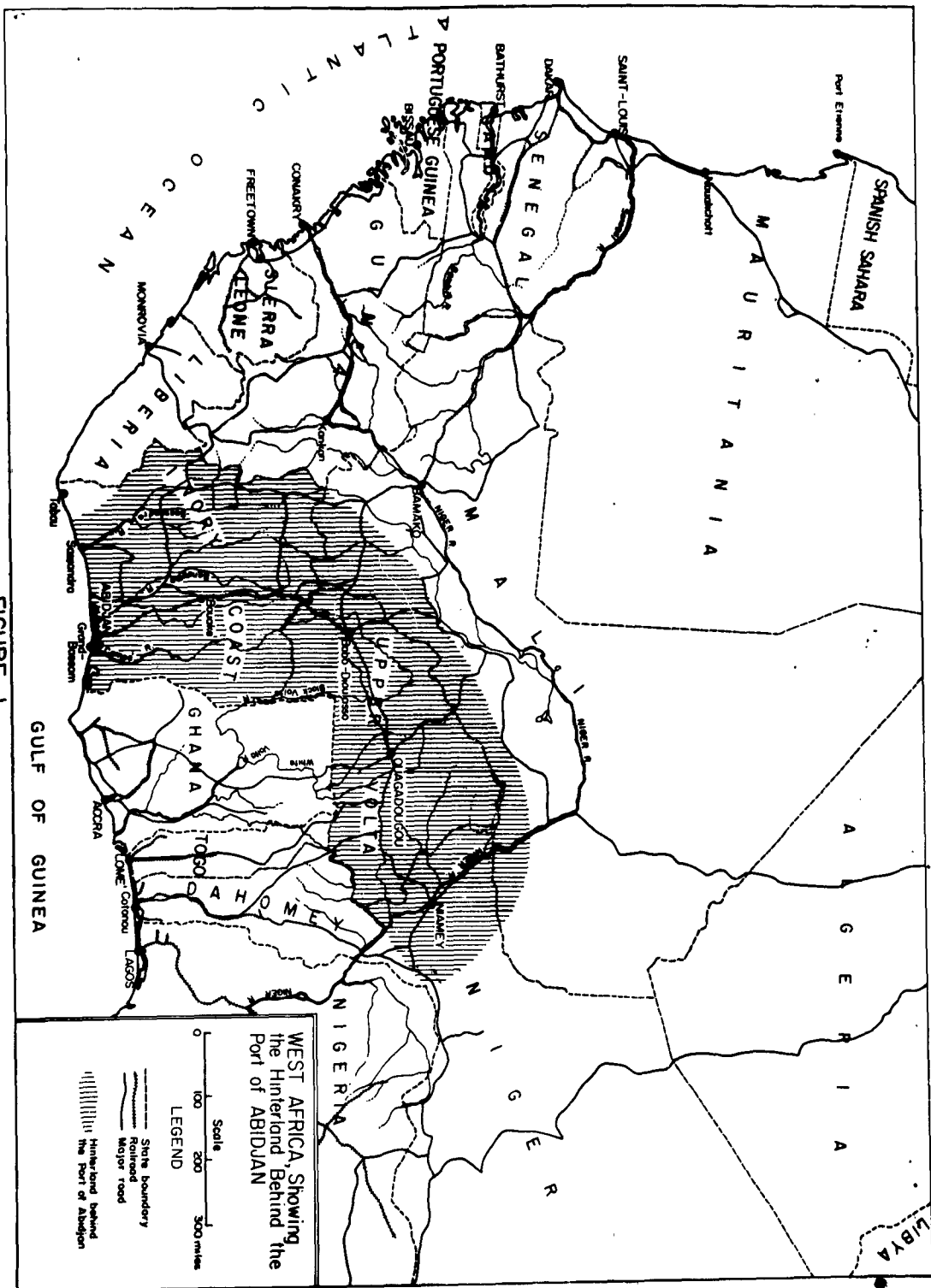


FIGURE 1

The extraordinary growth of the port of Abidjan is due to four principal factors: 1) Abidjan's replacement of the two existing wharfs at Port-Bouët and Grand-Bassam, which had a total manipulated tonnage of 348,000 tons in 1948; 2) the inhospitable nature of the coast in the Ivory Coast, which precludes or makes very difficult the construction of a deep-water port, there being no naturally protected harbors to compete with Abidjan; 3) the very favorable site of the port of Abidjan and the easy manipulation of cargo once the inhibiting factor of the dangerous sandbar was breached and penetration of the Ebrié Lagoon by deep-draft vessels was made possible; and 4) the relatively productive and variety-rich hinterland backing up the port, a hinterland extending from the equatorial rainforest in southern Ivory Coast (from which most of the export wealth is drawn), through the savanna in the northern portion of the country and southern Upper Volta, to the steppic zone in northern Upper Volta. The first of these factors, the replacement of Port-Bouët, enabled the new port to begin operations with an assured annual operating volume of over 400,000 tons, the continued operation of the older wharfs being economically unfeasible owing to the speedier, safer, and less expensive handlings in the port of Abidjan. It is also virtually certain that no major competitor to the new port will arise in the future in eastern Ivory Coast. The cost of constructing and maintaining such a port on the straight, unindented sandy stretch would far outweigh the cost of transporting merchandise to and from Abidjan via road or lagoon. The port of Abidjan, constructed at an initial cost of close to 20 million dollars, has been and is continuing to be developed into a magnificent, well-sheltered port capable of handling the needs of virtually the entire Ivory Coast and Upper Volta, to which it is

connected by the Abidjan-Niger Railroad (Régie Abidjan-Niger) running between the two capital cities of Abidjan and Ouagadougou. This railroad, running perpendicular to the coast and thus across the principal climatic zones, is the main feeder of the port, though running into severe competition from motor transportation.³ Only the large though relatively unproductive area of southwestern Ivory Coast escapes the pull of the railroad and the port, being serviced by the local secondary "ports" of Sassandra, Nero Mer, Grand-Béréby, and Tabou, each of which has a very restricted hinterland. In short, the new port of Abidjan, taking advantage of the fact that it is the only deep-draft, well-sheltered port on an otherwise inhospitable and repelling coast, has become the major port of the Ivory Coast and its tributary neighbor of Upper Volta, accounting for well over 90 per cent of the volume of overseas imports and exports of each of these states. And conversely, the economy of the Ivory Coast, responding to the opportunity offered to it by the low-cost, efficient, and quick handlings of the new port has managed to show an amazing dynamism in recent years, a dynamism which, it is hoped, will enable the Ivory Coast to reach or even surpass the socio-economic level of its neighbor to the east, Ghana. The emergence of the city and port of Abidjan as the new administrative, financial, commercial, and industrial hub of the Ivory Coast has been the key that has unlocked the door to such a promising future.

Historical Development

While the French were expending a great effort in the colonization and penetration of Senegal and the sudanese interior via the traditional

³ The main north-south road in the Ivory Coast runs from Abidjan to Bouaké to Bobo-Dioulasso to Ouagadougou, thus paralleling the Abidjan-Niger Railroad (see infra., pp. 33-37).

route of the Senegal River, the British, late in the eighteenth and early in the nineteenth centuries, were beginning to show an increased enthusiasm for the exploration and settlement of the coast of West Africa along the Gulf of Guinea. This enthusiasm was not, unfortunately, immediately shared by the French, with the result that early in the scramble for West African colonies and protectorates, the British acquired the four choice territories of the region: Nigeria, Gold Coast (present-day Ghana), Sierra Leone, and the Gambia. These territories included the best means of access to the interior, the best sites for port development, the densest populations, and/or the brightest economic potential. France, as the result of her preoccupation with Senegal and the Senegal River route into the Sudan, was forced to be satisfied with second choice along the Gulf of Guinea, namely in the two colonies of Dahomey and the Ivory Coast.

French claims along the Ivory Coast, with its heavy and dangerous surf, lack of a natural harbor for port development, relatively sparse population, and dense tropical forest, date from the establishment of three permanent trading posts in 1842 by Admiral Bouët-Willaumez at Grand-Bassam, Assinie, and Dabou, all on the lagoon-fringed eastern portion of the coast known as "la Côte des Bonnes-Gens." Earlier French interests along this coast were limited to the short-lived mission established in 1687 by Père Gonzalvez of Assinie, and to occasional dealings with the natives for ebony, ivory, and gold. Failing to follow the advice of Bouët-Willaumez, who advocated the extension of French rule in and penetration of West Africa from these trading stations, the French did nothing to extend claims far into the interior until 1889. At this time, reacting to the fear of the British linking the Gold Coast

with Sierra Leone and the consequent cutting of the Ivory Coast's potential land bond with French Sudan, the explorer Binger, coming from Bamako, joined up with the columns of Treich-Laplène coming from the coast. Four years later, following the boundary treaties with Liberia and Great Britain, the colony of the Ivory Coast was proclaimed, with Grand-Bassam selected as the capital. Then followed 22 years of internal ferment, with pacification of the entire country not coming until just after the outbreak of World War I.

Concomitant with the political development of the colony was that of its economic development, a development hindered to a very large extent by the lack of a deep-water port. The traditional colonial pattern was followed in the case of the Ivory Coast, with exports at the outset consisting of those items capable of being collected from the wild state, requiring little skill and even less capital: gold, ivory, wood, copal, palm kernels, and wild rubber. These in turn were complemented by the importation of goods necessary to satisfy simple local needs: cloth, alcohol, hardware, etc. Following the close of World War I, a rationalization of the economy was undertaken, with emphasis placed on the development of large-scale commercial agriculture, with detailed emphasis placed on cacao, coffee, and bananas to supplement the existing traditional exports. Cacao exports increased from 5,000 tons in 1925 to 22,000 tons in 1930, to 43,500 tons in 1935. Coffee, introduced later than cacao, increased from 445 tons in 1930 to 5,000 tons in 1935. Banana exports, introduced in 1932, had reached a total of 7,000 tons in 1935. During this same period, the nature of importations also witnessed a substantial modification, with construction materials, machinery, vehicles, and petroleum products assuming a dominant role. By 1939,

the last relatively normal pre-war year, exports from the Ivory Coast (Upper Volta had not yet been recreated as a separate political unit) had reached a total of 173,589 tons, while imports totaled 105,169 tons. Nine years, and a war, later, the respective figures had increased to 223,542 and approximately 125,000 tons, with the present-day pattern of coffee, cacao, exotic wood, banana, and palm product dominance clearly in evidence. With the two open wharves at Grand-Bassam and Port-Bouët and a series of open roadsteads (including those at Sassandra and Tabou), with their slowness of operations, extensive turnaround time, multiple handlings, load limitations, heavy handling losses, and consequent excessive costs, accounting for virtually the entire overseas trade of the colony, the need for a modern deep-draft port for the continued economic development of the Ivory Coast became apparent. After a history of failures, frustrations, and minor successes, the attempt to find an economical outlet for the colony came to fruit on August 1, 1950, when the first ship to use the new Vridi Canal entered the Ebrié Lagoon and anchored off the new port of Abidjan. This marked the beginning of the long-awaited economic boom in the Ivory Coast.⁴

Port Development in the Ivory Coast

The principal deterrent to the development of at least one major deep-water port in the Ivory Coast has been the nature of its coast. The western littoral from Cape Palmas to the town of Fresco is marked

⁴ For a further and detailed study of the historical development of the Ivory Coast, see: a) Jacques Richard-Molard, Afrique Occidentale Française (3rd ed. rev.; Paris: Éditions Berger-Levrault, 1956); b) Emmanuel Avice, La Côte d'Ivoire (Paris: Société d'Éditions Géographiques, Maritimes et Coloniaux, 1951) and c) G. Brasseur, L'A.O.F. (Dakar: Institut Français d'Afrique Noire, 1957).

by a series of low rocky cliffs, with an average elevation of 200 feet, broken only by occasional rivers and their respective sandy bays. These small streams (among which are the Tabou, Nero, San Pedro, and Sassandra rivers) are not navigable, being blocked by numerous rapids and sand banks, and thus never provided even minor routes of penetration into the interior. In addition, the rocky and/or sandy nature and limited extent of the bays precluded their development as major ports. This stretch, known locally as "la Côte des Mal-Gens" owing to the early cannibalistic nature of the local Kru inhabitants, was rarely visited by European traders, and even today remains the most underdeveloped region of the Ivory Coast. East of Fresco, however, and extending to the Ghanaian border, the coast becomes low, smooth, and sandy, formed by a virtually continuous sandbar, broken only by three natural, unstable and silty channels: 1) the Bandama River at Grand Lahou; 2) the Comoé River at Grand-Bassam; and 3) the Bia and Tanoé rivers and the Aby Lagoon at Assinie. A fourth breach is the man-made one of the Vridi Canal leading to the Ebrié Lagoon near Abidjan. The sandbar is bordered on the landward side by a series of lagoons, the largest of which are the Aby, Ebrié, Grand-Lahou, and Fresco lagoons (see Fig. 7). On the seaward side of this amazingly straight sandbar, the shore is very sharply inclined, reaching at times a slope of 30 degrees, with powerful and heavy surfs constantly attacking the sand. These surfs and the resultant loosened sand coupled with the eastward flowing Guinea Current produce a constant drift of sand along this coast, a drift which has a tendency to accumulate and clog existing channels in the sandbar. This has been the principal obstacle to the conversion of these natural channels and their respective lagoons into deep-water ports. Consequently,

until the construction of the Vridi Canal and the development of the port of Abidjan, the Ivory Coast was entirely dependent upon open roadsteads and, more recently, open wharves for the manipulation of its overseas trade.

Prior to 1895, virtually the entire overseas trade of the Ivory Coast passed through the two open roadsteads of Assinie and Grand-Bassam. The former, as was noted earlier, was the site of the first French mission in the Ivory Coast, and was one of three sites selected by Bouët-Willamez in 1842 for permanent French settlement along the Guinea Coast. It also had the additional advantage of being backed-up by the Aby Lagoon and the Bia River, the latter being navigable to Aboisso by small vessels having a draft of under one meter. Unfortunately, for the reasons noted above, the breach in the sandbar is not navigable, and ocean-going embarkations and debarkations were conducted in the open roadstead, operations which were strongly handicapped by the nature of the surf and shore. Nevertheless, Assinie developed as an important ivory, palm oil, wood, rubber, and cacao "port" of the Ivory Coast. By 1907, it ranked third in importance behind Grand-Bassam, which by then had a wharf, and Grand-Lahou. However, Assinie could not compete with the newer wharves at Grand-Bassam and Port-Bouët backed by their feeder roads and on the Abidjan-Niger Railroad. By 1939, most of the traffic, with the exception of the bulkier woods, was diverted from Assinie to these wharves. Three years later, as the result of the erosional enlargement of the channel through the bar, the city of Assinie was washed out to sea. Today, Aby Lagoon is connected with Ebrié Lagoon by means of the Assinie Canal (see Fig. 7), which draws a large portion of the region's coffee, cacao, and wood production to the port of Abidjan.

The "port" of Grand-Bassam had a longer and more prosperous history than did Assinie, although with the opening of the port of Abidjan, it suffered a similar fate. It also was one of the sites selected by Bouët-Willamez as a permanent French settlement, but owing to its relatively more central location coupled with the fact that the Comoé River is navigable by shallow-draft vessels for a distance of 27 miles, it met with greater prosperity. In 1893 it was selected as the capital of the Ivory Coast Colony, and four years later the construction of a wharf, intended to overcome the dangers of the surf, was undertaken. Despite the outbreak of a violent epidemic of yellow fever in 1899 and the transfer of the colonial capital the following year to the higher, healthier site of Bingerville, the wharf was put into commission in 1901. Grand-Bassam prospered, and emerged as the wealthiest city in the Ivory Coast. Total manipulated cargo, primarily wood and palm products, rose from over 11,000 tons in 1907 to 74,000 tons in 1922, and it was decided to construct a second wharf at Grand-Bassam. However, the same year (1922) that the new wharf was completed, the old one was destroyed by a storm, with the result that Grand-Bassam was unable to handle efficiently the increased traffic accruing from the expansion of the new railroad into the interior and the development of commercial agriculture. By 1929, traffic at the wharf had increased to 169,000 tons, and plans were made once again to construct a second wharf, this time 20 miles to the west in greater proximity to the terminus of the railroad, which in contemplation of the future, was placed at Abidjan. The site of the new wharf was to be Port-Bouët. This wharf was completed in 1931, was linked directly with the railroad, and had the immediate effect of replacing Grand-Bassam as the number one port of the colony. The latter

gradually lost most of its traffic with the exception of wood. Its total tonnage handled in 1948 dropped to 95,000 tons and, with the opening of the port of Abidjan in 1950, the wharf at Grand-Bassam fell into complete disuse.

Little further need be said about the wharf at Port-Bouët. In its short but happy life it witnessed an almost immediate ascendancy to primary position in the overseas trade of the Ivory Coast, jumping from 6,300 tons of manipulated cargo in 1931 to 245,000 tons in 1948. Being connected by rail with the terminus of the Abidjan-Niger Railroad at Abidjan, it drained virtually all of the coffee, cacao, bananas, palm products, and most of the wood leaving the Ivory Coast, and also became the most important passenger "port" of the colony. It also became the servicing "port" for the materials necessary for the construction of the Vridi Canal and the first port installations. It, in turn, was also replaced by the opening of the Ebrié Lagoon in 1950.

The only other historically important roadstead whose functions were usurped by the Port-Bouët - Grand-Bassam complex, and subsequently by the port of Abidjan, was the late nineteenth century "port" of Grand-Lahou, developed as the evacuation point for most of the colony's wild rubber and ivory exports. It also drained the palm oil and palm kernels of the extreme western portion of the Ebrié Lagoon and of Grand-Lahou Lagoon, basing its development largely upon its proximity to the Bandama River, which is navigable for a distance of 36 miles during the wet season and 27 miles during the dry season for boats drawing up to one meter. However, as in the case of Assinie and Grand-Bassam, uncertainty of location and silting of the channel across the sandbar prevented the development of a deep-water port in the lagoon backing up the town,

with the result that an open roadstead was resorted to for the manipulation of cargo. With the construction of the Asagny Canal joining the Ebrié and Grand-Lahou lagoons, most of Grand-Lahou's cargo drained toward the Abidjan - Port-Bouët complex, with the result that by 1939 it had virtually lost its commercial functions. Today, virtually all of the palm products, wood, and manganese are originating in this vicinity pass via the Asagny Canal and Ebrié Lagoon to Abidjan.

Occasional minor roadsteads have developed along this lagoon-fringed eastern coast of the Ivory Coast as demanded by local needs. Two such ex-roadsteads are Jacqueline, formerly an exporter of palm oil and rubber, and Fresco. However, beginning with the construction of an open wharf at Grand-Bassam (and subsequently at Port-Bouët) coupled with the improvement in road and lagoon transportation in this stretch of the Ivory Coast extending from Fresco to the Ghanaian frontier, virtually all of this region's overseas commerce became centered on the Grand-Bassam - Port-Bouët - Abidjan complex. This concentration was further reinforced by the construction of the Abidjan-Niger Railroad and the eight mile spur leading to the wharf at Port-Bouët, the combination of which drained an extended hinterland far into the interior. Owing to the factor of distance coupled with the lack of a lagoon-backed sandbar and/or connecting feeder roads, the western coast and its back-country was not drawn into this web, and was forced to "go it alone." The result has been the relative lack of development of the southwestern portion of the Ivory Coast, and the emergence of four minor secondary "ports", Sassandra, Tabou, Nero Mer, and Grand-Béréby, each of which has a very limited local hinterland. In 1961, these four minor ports accounted for less than one per cent of the total volume of debarkations

in the ports of the Ivory Coast and for approximately ten per cent of the total embarkations, almost entirely wood. In 1950, with the breaching of the sandbar near Vridi and the opening of the deep-water, well-sheltered port of Abidjan, the pull of the new port became overwhelming, and led to the abandonment of the wharves at Port-Bouët and Grand-Bassam, the great economic expansion of the Ivory Coast, and the concentration of commercial activity at the new port.⁵

The Site of the Port of Abidjan

The present-day structures of the port of Abidjan are the result of 25 years of planning. However, the idea of such a port at or near the present site of Abidjan has been discussed since before the turn of the century. A combination of 5 factors had led to its early selection as the site for the eventual deep-water port of the Ivory Coast:

- 1) the attraction of the large Ebrié Lagoon as a natural harbor once the sandbar was pierced and as a natural means of internal communication;
- 2) a relatively productive hinterland; 3) the fact that the dense coastal rainforest in the Ivory Coast was at its narrowest north of Abidjan, thus allowing easier construction of a railroad to the Sudan; 4) the selection of Abidjan as the first center of operation of the large West African trading firm of la Compagnie Française de l'Afrique Occidentale (C.F.A.O.); and 5) the existence just off the sandbar near the village of Petit-Bassam, near present-day Abidjan, of the geomorphological phenomenon known as "le Trou-sans-fond." This latter factor is perhaps the most important one in the early selection and present-day development of the site of the port of Abidjan. It is a remarkable submarine

⁵ For an excellent study of port development in the Ivory Coast leading up to the construction of the Vridi Canal, see Gabriel Rougerie, "Le Port d'Abidjan," Bulletin de l'Institut Français d'Afrique Noire, Tome XII, No. 3 (Juillet 1950), pp. 751-837.

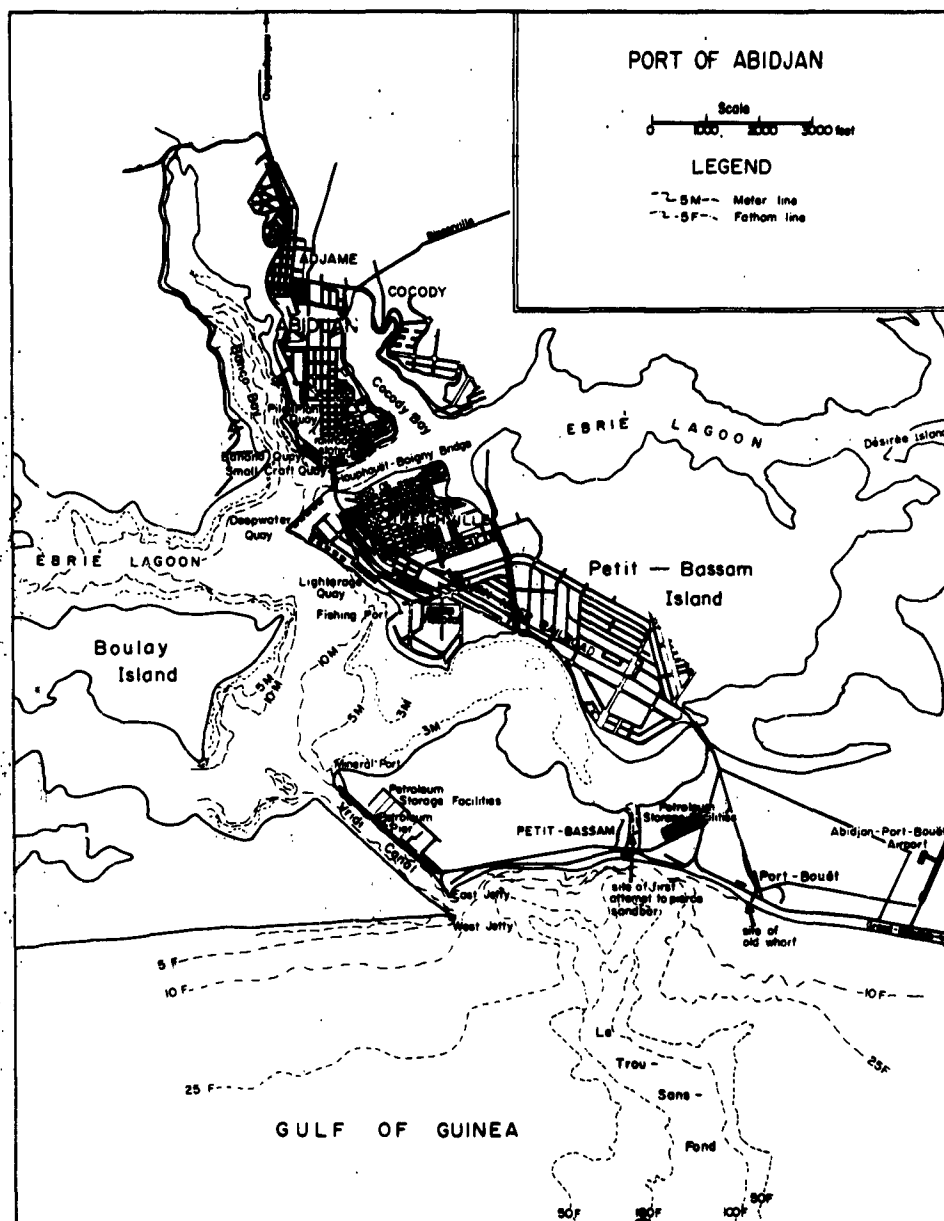


FIGURE 2

As a result of the large increase in overseas trade experienced in the 1920's by the Ivory Coast, and the difficulties experienced in its manipulation by the existing facilities, studies were undertaken in 1927 for the reopening of the Abidjan project. After exhaustive studies were made, including construction and testing of a model of the coast at Delft in the Netherlands, contracts were awarded in 1936 for the construction of the present-day canal at Vridi, and for the first installations of the port of Abidjan. Construction of the canal was begun two years later, with a tentative completion date set for 1941, but, delayed by World War II and subsequent shortages of capital and material, the first ship did not enter Ebrié Lagoon until August 1, 1950. For the ensuing five years, embarkations and debarkations were handled by means of lighters plowing between the Small Craft Quay on the southern end of Abidjan Peninsula (constructed between 1948 and 1950) and the ships anchored or moored in the protective confines of Ebrié Lagoon. The first stretch of deep-water quay, constructed between 1951 and 1955, was put into service on September 1, 1955, with five operating berths. The dream of the turn of the century had at long last become a reality.

The Vridi Canal

Once the sandbar was permanently pierced by the Vridi Canal, a magnificent harbor was opened up to port development. Original plans for the construction of the main portion of the port called for the development of Banco Bay along the western side of Abidjan Peninsula and immediately adjacent to the Abidjan-Niger Railroad. However, these plans were subsequently modified, with the principal deep-water quays being constructed along the western shore of Petit-Bassam Island owing to the greater

developable space located there, as well as its greater accessibility. Banco Bay has been limited to the handling of wood and bananas, as well as the site of the Small Craft Quay.

The natural harbor of the port of Abidjan is virtually unlimited, since with requisite dredging, virtually the entire Ebrié Lagoon can be opened to deep-draft navigation. Thus, the port should never experience any expansion difficulties in the future. However, to arrive at a specific figure, over 1,000 hectares (approximately 2,500 acres) of the lagoon are navigable to vessels drawing up to 10 meters, which is also the maximum quayside accomodating draft. An additional size limitation for vessels calling at the port of Abidjan is imposed by the change of course at the seaward end of the Vridi Canal, which limits the maximum length of such vessels to 185 meters. No beam limitations exist for the canal or the port. Thus, once the canal is traversed, no further navigational difficulties are encountered by vessels calling at the port, although pilotage is mandatory for entering and passing through the canal, as well as in following the channel to the respective berth.

The Vridi Canal has a total length of 2.7 kilometers (1.7 miles) and, with the exception of the 500-meter stretch at the seaward end, a surface width of 270 meters. Beginning 500 meters from the sea, the canal gradually tapers to a surface width of 250 meters at its seaward entrance. A profile across the width of the canal (and once again with the exception of the narrower seaward portion) shows a gradual taper to a mean water width of 300 meters at a depth of 10 meters and 200 meters at a depth of 15 meters. At the seaward entrance to the canal, the bed has a mean water depth of 12 meters, at which level the canal has a width of 185 meters. The sides of the Vridi Canal

are protected against tidal erosion (the maximum tidal range being 1.2 meters) by a matting of bamboo balasted by a covering of riprap (a rough foundation of loose stone). In addition, a similar though stronger, covering protects the bed of the canal bordering the ocean. An idea of the immensity of the task involved in the construction of the canal is shown by the following statistics: 1) over 18 million cubic meters of sand and dirt were removed in digging the canal; 2) over one million tons of rocks were used as anti-erosive ballast and in the construction of the two jetties; and 3) over 450,000 square meters of bamboo matting were laid. The construction of the 520-meter-long West Jetty and the 180-meter-long East Jetty, of which 420 and 80 meters, respectively, project into the ocean, led to the diversion of the coastal drift sands towards and into "Le Trou-sans-fond," with the result that siltation of the Vridi Canal is virtually nil. The only difficulties to navigation within the canal, in addition to draft and length limitations, are those arising from occasional swells and those due to the diurnal passage of tidal currents into and from the Ebrié Lagoon. The former, reaching at times as far as the Petroleum Pier approximately midway through the canal, can and often do prevent ships from entering the canal. The daily movements of tidal currents through the canal, which can easily turn a ship sideways, present a daily limitation to ship movements through the Vridi Canal, such movement in either direction being limited to periods when the current is not very strong. These daily periods are determined well in advance by port authorities in order to enable incoming and outgoing vessels to time their movements to avoid unnecessary and costly delays at either entrance to the canal. Once the Petroleum Pier is reached by incoming ships, the remainder of the canal, as well as the harbor proper, is safe from winds and swells.



Fig. 3 - The old wharf
at Port-Bouet.

Fig. 4 - Berths 1-4,
Deepwater Quay (West Quay),
Port of Abidjan.

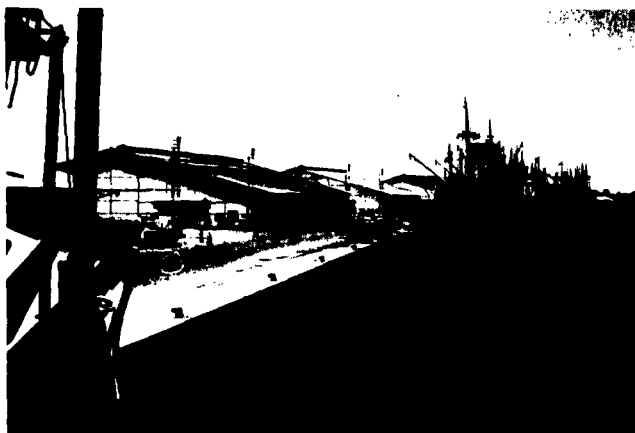


Fig. 5 - Unloading
general cargo, West Quay,
Port of Abidjan.

(Photos by R.J.P.)

harbor was used in the construction of the 156,000 M² terreplein backing up these quays. In addition, ten closed warehouses with a covered area of 53,000 M² round out the principal facilities of this section of the port, which is tied directly with the Abidjan-Niger Railroad by means of a spur leading from the terminal on Abidjan Peninsula and crossing the lagoon via the new Houphouët-Boigny Bridge. Cargo manipulations are performed entirely by the rigs of the vessels and small mechanized quay equipment, there being no gantry cranes available in the port of Abidjan, although two floating cranes are available on special call. It is this section of the port that handles virtually all of the non-petroleum debarkations at the port as well as all of the embarkations with the exception of bananas, wood, and manganese ore. Despite a maximum handling capacity of over 7,500 tons per day, an adequate labor force of 1,150 men from which to draw (and which the port authorities consider to be one of the best in West Africa), the rarity of labor disputes, and an average turnaround time of two days, the deep-water quays have had difficulty in satisfying the demands placed upon them, as is evidenced by the fact that this section of the port is operating at close to 100 per cent capacity, with ships very often having to wait for a berth.⁶ To ameliorate this difficulty, Berth 10 was constructed in 1960, with the probability of additional deep-water berths becoming necessary if the economy of the Ivory Coast continues to expand. Fortunately, as we have noted, expansion presents no serious physical difficulty for the port of Abidjan.

⁶ In 1961, approximately 827 tons of merchandise were loaded or unloaded for every meter of deepwater quay. In 1960, the comparable figure was 685 tons. According to port authorities, the optimum figure should be 500 tons. Even taking into consideration the added burden brought about by movement of goods to and from Mali as a result of the rift between Senegal and Mali, the figure is well above the optimum.

Additional facilities devoted to special uses exist in the other sections of the port. The Lighterage Quay, formerly used by fishing boats and occasionally for lighterage manipulations, is backed by a terreplein of 10,000 M² and covered storage space of 2,000 M². The Small Craft Quay is used mainly by lagoon barges and occasionally for lighterage operations, while the adjacent Banana Quay is used exclusively for the loading of bananas. The Pile-plank Quay is used for the storage of wood. These three quays are backed by a terreplein of 99,000 M², warehouses having a total floor space of 17,500 M², and 2,570 M² of covered storage areas. These special quays are also connected directly with the main line of the Abidjan-Niger Railroad, but most of their activities are fed by road and lagoon. Owing to the nature and extent of their operations, they have not experienced the problem of full capacity suffered by the deep-water quays, with banana boats calling periodically and the logs being towed to ships anchored or moored in the lagoon or berthed in the deep-water section.

The Petroleum Pier is located in the mid-section of the Vridi Canal, and feeds the adjacent petroleum storage facilities of the African Petroleum Terminal (45,000 M³ capacity) and Shell (31,625 M³ capacity), and the more distant facilities of Mobiloil (33,100 M³ capacity). In addition, Shell has a 1,100 M³ butane storage tank within its terminal. All three terminals are located on the offshore sandbar and are connected by rail with Abidjan and the interior. Virtually all of the petroleum imports are for consumption in the Ivory Coast, Upper Volta, and Niger, with only a very small amount being consumed as bunker fuel. Abidjan is not a bunkering port, although water is available at quayside, and diesel fuel can, in an emergency, be obtained by means of a tank-vessel

having a capacity of 180 tons. Unless talk of the addition of bunkering facilities at Abidjan materializes, ships will continue to call at Dakar, Freetown, Las Palmas, or other African ports for such provisioning.

The manganese ore berth was constructed by the Compagnie de Mokta to evacuate the ore from its mine near Grand-Lahou. This deposit has an estimated reserve of 13 million tons of ore with an average metallic content of 48 per cent. After enrichment at the mining site, the ore is evacuated via lagoon to the new mineral port on barges, unloaded, and stored (see Fig.10). When sufficiently accumulated, it is evacuated to markets in France. Production and exports are expected to stabilize at approximately 100-120,000 tons of ore per year.

The port facilities at Abidjan are geared almost entirely for the needs of its hinterland, and unlike the port of Dakar, do not provide many services for visiting vessels or for military needs. As has been noted above, bunkering facilities, except for water, do not exist at Abidjan. This port does not have a superior location for the development of this function as does the port of Dakar, the indentation of the Gulf of Guinea removing Abidjan from the main Atlantic trade routes. This also accounts for the limitation of ship repair facilities to a small 150-ton floating dry-dock owned by CARENIA, used for repairing tugs and fishing boats, with larger vessels moving to Dakar for repairs. Similar reasons, as well as a late start, account for the absence of naval facilities at the port, the strategic location of Dakar having drawn the attention of naval strategists. Thus, the facilities of the port of Abidjan are geared almost entirely to the exchange of goods and passengers between ocean carriers and the hinterland, with most of the activity centering at the two deep-water general cargo and passenger quays. That these

facilities are generally inadequate, despite a steady expansion program, is manifest by the fact that operations at these quays often approach 100 per cent capacity, with vessels often waiting for a berth.⁷ Indications are that with the apparent continuing growth of the economy of the Ivory Coast and its newly found prosperity, existing facilities will prove inadequate, with probable expansion programs calling for the development of Banco Bay into a general cargo area. However, no definite plans have yet been formulated.

Traffic at the Port of Abidjan

Traffic at the port of Abidjan, whether measured in terms of ships calling at the port, net registered tonnage, or cargo manipulations, has shown a remarkable increase since the opening of the new port in 1950. This rise was conditioned largely by the stimulus to the Ivory Coast economy brought about by the substitution of the old wharves at Grand-Bassam and Port-Bouët by the modern, sheltered port of Abidjan. It is estimated that the construction of the port and the installation of deep-water quays have reduced the cost of manipulation of embarkations and debarkations by at least one-half.⁸ Applying the formula provided in this study to the amount of cargo handled in 1961 and converting the savings into dollars, it appears that at least 10 million dollars were saved in that year by the replacement of the old wharves. It should also be noted that the system of wharves had the effect of asphyxiating the economy of the Ivory Coast, since the 2,378,366 tons of cargo manipulated by the port of Abidjan in 1961 could never have been handled by

⁷ In 1961, the number of days that the number of ships in the port of Abidjan were above the normal capacity totaled 194. In 1960 and 1959, the respective figures were 173 and 150.

⁸ République de Côte d'Ivoire, Service de l'Information, Le Port d'Abidjan (Septembre 1958), p. 10.

TABLE I: Analysis of Traffic at the Wharves at Port-Bouët and Grand-Bassam for 1948, and at the Port of Abidjan for 1958 and 1961

	<u>1948</u>	<u>1958</u>	<u>1961</u>
Number of Ships Entered	363	1,417	1,933
French	218	569	705
Other	145	848	1,228
Net Registered Tonnage (1,000 tons)	1,246	3,485	5,140
French	588	1,708	2,029
Other	658	1,777	3,111
Merchandise Debarked (tons)	131,153	589,724	1,057,539
French	86,309	207,199	379,877
Other	44,844	382,525	677,662
Merchandise Embarked (tons)	236,320	635,849	1,320,827
French	158,986	286,691	518,161
Other	77,334	349,158	802,667
Number of Passengers Debarked	N.A.	12,482	15,142
Number of Passengers Embarked	N.A.	23,140	10,101

N.A. - Figures are not available.

Sources: a) Territoire de la Côte d'Ivoire, Ministère du Plan, Service de la Statistique, Inventaire Économique de la Côte d'Ivoire (1947 à 1956), pp. 166, 170.

b) République de Côte d'Ivoire, Ministère des Finances, des Affaires Économiques et du Plan, Direction de la Statistique, des Études Économiques et Démographiques, Bulletin Mensuel de Statistique, 14^e année, No. 6 (Juin 1961), p. 6.

c) République de Côte d'Ivoire, Ministère des Finances, des Affaires Économiques et du Plan, Direction de la Statistique et des Études Économiques et Démographiques, Situation Économique de la Côte d'Ivoire 1961, Juillet 1962, pp. 51-52.

TABLE II: Analysis of the Number, Types, and Registry of Ships Calling at the Port of Abidjan in 1958 and 1961

	<u>1958</u>	<u>1961</u>
<u>Ocean Liners</u>	<u>89</u>	<u>88</u>
French	87	88
Other	2	0
<u>Cargo Ships</u>	<u>1,188</u>	<u>1,536</u>
French	406	435
West German	198	187
Norwegian	93	169
British	81	156
Italian	115	130
Dutch	83	101
Danish	*	66
American	69	64
Swedish	*	47
Panamanian	*	27
Ivory Coast	-	8
Other	143	146
<u>Petroleum Tankers</u>	<u>37</u>	<u>58</u>
British	13	28
Norwegian	10	12
Other	14	18
<u>Banana Boats</u>	<u>69</u>	<u>126</u>
French	49	114
Ivory Coast	-	7
Other	20	5
<u>Other Ships</u>	<u>36</u>	<u>125</u>
French	22	63
Other	14	62
<u>Total Number of Ships</u>	<u>1,419</u> **	<u>1,933</u>

* Figures included in "Other" total.

** Note discrepancy with 1958 total in Table I.

Sources: a) See Table I, source b.

b) See Table I, source c.

TABLE III: Analysis of Merchandise Embarkations and Debarkations at
the Port of Abidjan in 1961

	<u>Tons</u>	<u>Percentage</u>
<u>Embarkations</u>		
Roundwood	690,213	52.3
Sawed Timber	28,493	2.2
Coffee	156,075	11.8
Manganese Ore	113,775	8.6
Cacao	89,619	6.8
Bananas	86,106	6.5
Peanuts	50,930	3.9
Cola Nuts	21,273	1.6
Pineapples	12,468	0.9
Palm Kernels	12,360	0.9
Scrap Iron	6,275	0.5
Cotton	4,431	0.3
Cotton Seed	3,402	0.3
Other Merchandise	45,407	3.4
TOTAL	<u>1,320,827</u>	<u>100.0</u>
<u>Debarkations</u>		
Petroleum Products	268,830	25.4
Cement	212,143	20.1
Iron Frames	53,615	5.1
Sugar	47,344	4.5
Salt	45,967	4.3
Flour	45,899	4.3
Rice	44,308	4.2
Wine	32,565	3.1
Textiles	25,831	2.4
Fresh Foodstuffs	18,862	1.8
Motor Vehicles	15,747	1.5
Other Merchandise	246,428	23.3
TOTAL	<u>1,057,539</u>	<u>100.0</u>

Source: See Table I, source c, pp. 52-53.

the two old wharves. Thus, there is little doubt that the creation of a modern port was indispensable to, and an important cause of, the rapid upsurge in the economic development of the country in the last decade.

The number of ships calling at the Abidjan - Port-Bouët - Grand-Bassam complex increased from 547 with a net registered tonnage of 2,005,000 tons in 1950 (the last year of operations of the two old wharves), to 1,933 with a net registered tonnage of 5,140,000 tons in 1961. At the same time, the role of French shipping showed an absolute gain, but a relative loss, now being surpassed by the combined totals for foreign vessels. In 1961, ships flying the French tricolor accounted for 36 per cent of the total ships calling at the port and 39 per cent of the total net registered tonnage (see Table I). The relative decrease in the role of French shipping in servicing the rising needs of the Ivory Coast can best be explained by the rapid rise of merchant fleets in other countries, notably West Germany, Norway, Netherlands, and the flag of convenience states, and by increasing competition. Many of these foreign vessels were, however, chartered by French concerns.

Most ships calling at Abidjan operate on a scheduled basis, and connect the city with European, North American, and Far Eastern ports. Tramping represents a small portion of the ships entering the port, probably less than ten per cent⁹, although no statistics in this regard are maintained. The principal European lines servicing Abidjan are:

- 1) the French Compagnie Maritime des Chargeurs Réunis;
- 2) the French Compagnie de Navigation Fabre-Fraissinet;
- 3) the French Société Navale Delmas-Vieljeux;
- 4) the French Société Navale de l'Ouest;
- 5) the French Armement Denis Frères;
- 6) the British Elder Dempster Lines;
- 7) the

⁹ Estimate of the port captain.

British Palm Line; 8) the German Woermann Linie; 9) the Dutch Holland West Africa Line; 10) the Swedish Scandinavian West Africa Line; 11) The Norwegian Høegh Line; 12) The Danish Maersk Line; and 13) the Italian Lloyd Triestino. American interests are represented by the Farrell Lines and the Barber West African Line, both out of New York, and the Delta Line, out of New Orleans. In addition, Africa is represented by the Ghanaian Black Star Line and the Ivory Coast's Société Ivoirienne de Navigation (S.I.N.A.) And finally, note should be made of the Israeli Zim Cargo Line and the Japanese Mitsui Line, both of which call regularly at the port of Abidjan. While there is no scheduled coastal shipping solely between Abidjan and the minor ports of the Ivory Coast, scheduled service is provided between Abidjan and the ports of former French West Africa between Dakar, Senegal and Cotonou, Dahomey by two coastal freighters, the "Diorbane" and the "Avodire". Additional service is also provided by many of the freighters moving along the coast on their runs from or to Europe. In 1960, over 30,000 tons of such intra-community cabotage traffic, mainly wood, coffee, skins, tobacco, and cotton, left Abidjan (over 90 per cent going to Senegal), while over 45,000 tons came in, over one-half of which was flour and cement from Dakar.

Merchandise manipulations at the port of Abidjan have also shown a remarkable increase in the past decade. From 577,000 tons in 1950, the total cargo manipulated by the Abidjan complex increased to 1,225,373 tons in 1958 and 2,378,366 tons in 1961. This latter figure includes 1,057,539 tons of debarkations and 1,320,827 tons of embarkations. In terms of specific commodities, the largest volume of exports passing through the port of Abidjan in 1961 were exotic logs (690,213 tons), coffee (156,075 tons) manganese ore (113,775 tons), cacao (89,619 tons), bananas (86,106 tons),

sawed timber (28,493 tons), and peanuts (50,930 tons). Petroleum products (268,830 tons) and cement (212,143 tons) were the two principal volume imports (see Table III). With the continued growth of the economy of the Ivory Coast virtually assured, these figures are bound to increase still further. Also, additional items, such as rubber, pineapples (exported to some extent today), and fish are bound to make their appearance among the leading export commodities. It is very unlikely that exportation of local manufactured goods will play a very important role in the port embarkation statistics as they do in the case of the port of Dakar, since most of the industries that exist in, or are planned for, Abidjan are geared for the satisfaction of local (Ivory Coast and Upper Volta) demands. And finally, note must be made of the fine opportunity offered by the creation of the European Economic Community both as a source of development capital through its Development Fund for Overseas Countries and Territories and as a 180 million strong virtually captive market for the overseas associated states. The big problem at present would appear to be the opening up and development of the hinterland behind the port of Abidjan.

The City of Abidjan and its Industrial Complex

From a small village of fishermen only 50 years ago, Abidjan has developed into the administrative, financial, commercial and industrial center of the Ivory Coast. This transformation began with the selection of the site of the village as the terminus of the Abidjan-Niger Railroad in 1904, gained momentum with its selection as the new capital of the colony in 1934, and gained full speed with the construction of the Vridi Canal and the opening of the Ebrié Lagoon to deep-draft navigation in 1950. The population of the city and its immediate environs increased from

46,000 in 1945 to over 150,000 today.

The city proper is situated on Abidjan Peninsula, a narrow, elevated peninsula on the north shore of Ebrié Lagoon. This higher, healthier land is known locally as "le Plateau," and on it are found the better residences, most government administrative buildings, and the finer shopping centers of the city. Immediately to the north is the crowded African suburb of Adjamé. To the west is Banco Bay, along which lie the Pile-plank Quay, the Banana Quay, and the Small Craft Quay, as well as the main Abidjan railroad station. To the east is Cocody Bay, across which the new African suburb of Cocody, with its rows of modern villas, is located. South of Abidjan, and connected to it by the new Houphouët-Boigny Bridge (completed in 1958), lies Petit-Bassam Island, with the African suburb of Treichville, the Deepwater Quay, the Lighterage Quay, the new fishing port, and the industrial quarter of the city (see Fig. 2).

Most of the industries located in Abidjan are market and/or labor oriented, the agglomeration being the largest and wealthiest in the Ivory Coast. However, another drawing factor is the existence of the port. Included among the industries are the usual ones found in most African cities: 1) those producing soft drinks and beer; 2) bread and cake bakeries; 3) simple metal fabricators; 4) construction companies; and 5) miscellaneous small consumer goods manufacturers. In addition, certain specialized industries exist, industries attracted to the Ivory Coast by the existence of basic raw materials or by the recent economic boom. Specific mention should be made of the following:

1. Grands Moulins d'Abidjan - a flour mill located in the port zone and connected directly with Berth 10. Completed in 1961, the mill has an annual capacity of 40,000 tons of flour made from wheat imported from France, the United States, and Argentina. The market for the flour is almost entirely in the Ivory Coast and Upper Volta.

2. Compagnie Africaine de Produits Alimentaires (C.A.P.R.A.L.) - a producer of instant coffee, this factory is the first industrial subsidiary of the Nestlé Company in tropical Africa. Completed in 1961, this plant is capable of treating 5,000 tons of green coffee a year. Markets for the coffee are chiefly in Europe.
3. Société Africaine de Fabrication des Automobiles Renault (S.A.F.A.R.) - completed near the end of 1961 in the port zone, this automobile and truck assembly plant has an annual capacity of over 1,400 vehicles.
4. Huilerie et Savonnerie des Lagunes (Blohorn et Fils) - an annual producer of approximately 10,000 tons of soap from local and imported palm oil, palm kernels, copra, and peanuts. This factory is located in Cocody, and markets its soap throughout former French West Africa.
5. Compagnie Franco-Africaine de Raffinage - a producer of table oil (approximately 4,000 tons a year) and margarine (approximately 1,000 tons a year) from local and imported palm oil and copra. Markets are located throughout the former federation.
6. Société Air Liquide - a producer of liquid oxygen (present capacity 400,000 M³) and acetylene (present capacity 90,000 M³), with markets in the Ivory Coast, Upper Volta, Mali, and Liberia.
7. Société Tropicale des Allumettes (S.O.T.R.O.P.A.L.) - established in 1961, this factory produces approximately 15 billion matches a year, with markets throughout former French West Africa.
8. Société des Conserves de la Côte d'Ivoire (S.C.O.D.I.) - a tuna fish canning concern established in 1960. It has a capacity of 6-10 tons (or 15-25 thousand cans) of tuna per day, and markets its product chiefly in Western Europe.
9. Société Devanlay-Recoing-Afrique - a producer of hosiery and cotton underwear, with markets also throughout the former federation.

Specific note should also be made of the existence in the Abidjan area of three small plastic manufacturers, numerous small sawmills, a

small ship repair yard (see supra, p. 23), a producer of tin cans from imported sheet metal, three small coffee roasting plants, a coffee sorting and cleaning plant, a coffee bag maker, and a producer of nails. However, it should be noted that these industries have contributed relatively little to the total cargo manipulations at the port of Abidjan (see Table III).¹⁰

Transportation Links With the Interior

The port of Abidjan is connected with its hinterland by means of road, lagoon, and the Abidjan-Niger Railroad. While no study as to the relative importance of each in feeding the port has been made, it can be said with a fair degree of certainty on the basis of available information and statistics that, in terms of total volume and value, motor transportation is most important, with lagoon transportation, on the basis of wood carried, a close second in volume. The relatively poor showing by the railroad is due to the fact that most of the exports of the Ivory Coast originate in the coastal forest zone of the country, and with the exception of wood, have a high value in relation to volume, thus being able to absorb the added motor cost. Wood, on the other hand, is a low-value commodity, capable of being transported very economically by water. Consequently, its exploitation is to a very large degree concentrated in areas within easy access to the lagoons or tributary rivers. However, the railroad becomes proportionately more important as one moves away from the coast, though, unfortunately, general commercial activity shows a reverse trend.

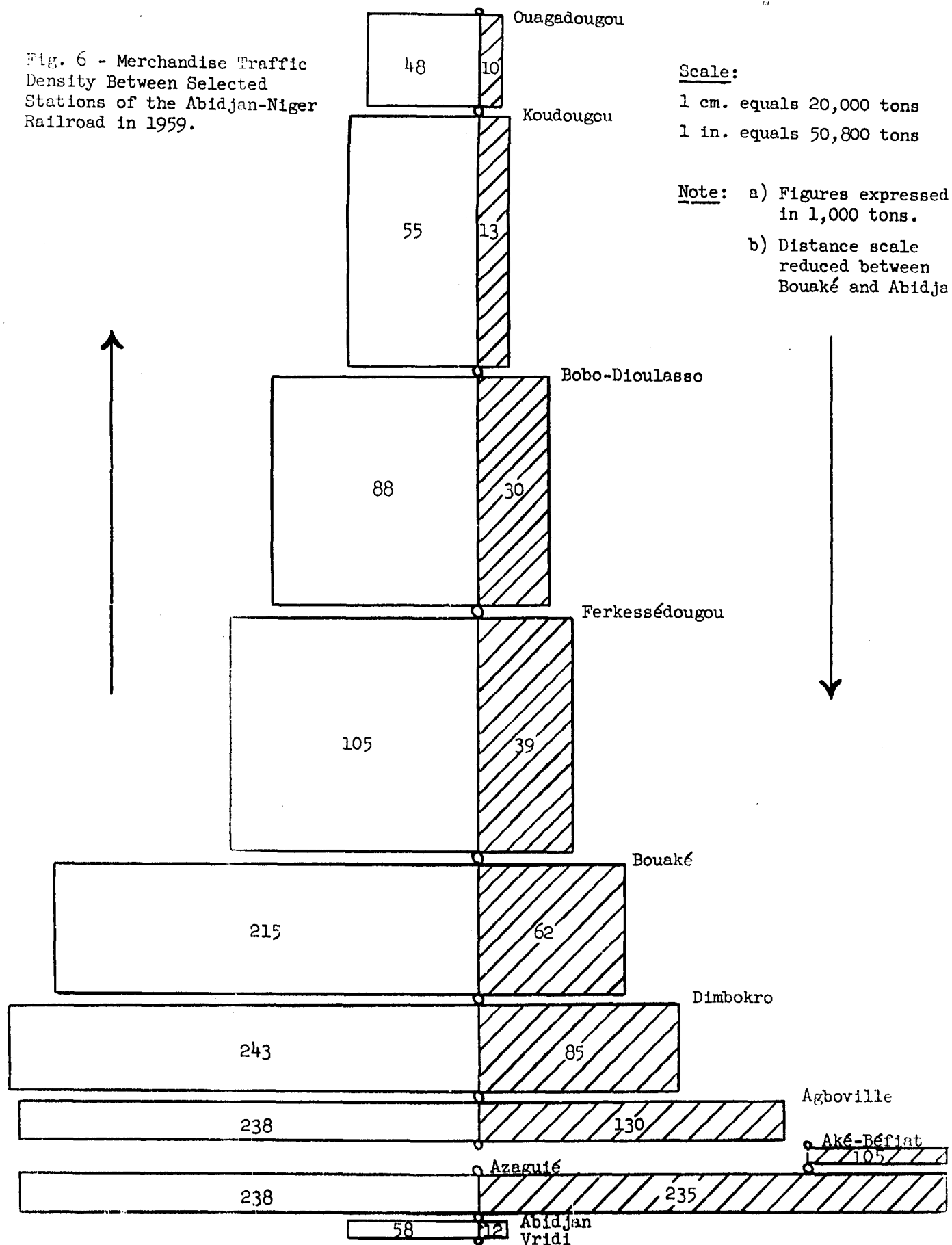
The Abidjan-Niger Railroad was envisaged as early as 1883 as the

¹⁰ For a very fine survey of industrial development in the Ivory Coast, see Chambre de Commerce et Chambre d'Agriculture et d'Industrie, L'Essor Économique de la Côte d'Ivoire (1 Août 1961), pp. 127-179.

main link between the coast and the Niger River. The original proposal called for the construction of a rail line from Grand-Bassam to Kong following the valley of the Comoé River. From Kong, the railroad was to continue on to the Niger River. This proposal was subsequently abandoned for the present route following the decision to construct a deep-water port on Abidjan Peninsula. This also enabled the line to pass through Dimbokro, at a point where the rainforest is least wide and the savanna comes closest to the Gulf of Guinea. Construction was started in 1904. The railroad reached Bouaké in 1912 and, following the delay induced by World War I, Bobo-Dioulasso in 1933. Six years later, work was started to extend the line to the heart of the populous Mossi country around Ouagadougou. Following the delay brought about by World War II, work was resumed in 1951, the project being completed in December 1954. Thus, the present-day pattern of the 1,145-kilometer (711-mile) main line of this standard meter-gauge railroad was firmly defined. The 13-kilometer (8-mile) spur leading to the wharf at Port-Bouët was completed in 1931 to connect the new wharf directly with the main line at Abidjan, and thus end the need for the lagoon barge link connecting Abidjan with Grand-Bassam. This spur is now partially abandoned. The Port-Bouët spur was extended westward along the sandbar to the site of the construction of the Vridi Canal, this 21-kilometer (13-mile) spur now being used to service the nearby petroleum storage facilities. And finally, mention should be made of the small 16-kilometer (10-mile) spur leading to the rock quarries at Aké-Béfiat, 58 kilometers (36 miles) north of Abidjan, from which the Société de Dragage et de Travaux Publics quarries and hauls over 100,000 tons of pebbles, sand, and gravel a year.

The Abidjan-Niger Railroad suffers very severely from road competition, the main road from Abidjan to Upper Volta running virtually

Fig. 6 - Merchandise Traffic Density Between Selected Stations of the Abidjan-Niger Railroad in 1959.



Source: Régie Abidjan-Niger.

parallel with its track (see Fig. 1). In 1957, with increased truck registrations in native hands, competition reached its peak, with a very sharp decrease in passenger and merchandise haulage. The implementation of new railroad tariff rates the following year succeeded in reversing this trend in a striking manner, though at the expense of total revenue intake, with the result that operating conditions on the railroad are at best described as poor. Government subsidies are required to ensure the continuation of certain merchandise haulage deemed necessary for continued economic growth, cement being perhaps the best example. In 1959, the railroad accounted for close to 100,000 tons (approximately 15 per cent) of the total volume of goods delivered to the port for embarkation, and carried away over 130,000 tons (approximately 20 per cent) of debarked merchandise.¹¹ The creation of the petroleum pier and the consequent low-cost debarkation of petroleum products by pipeline in lieu of barrels resulted in the complete conversion of the railroad to diesel locomotion in 1957.

The future of the Abidjan-Niger Railroad is very problematical. It probably will always continue to play a fairly important role in servicing the port of Abidjan, especially for those regions along the rail line, in the upper half of the Ivory Coast, and in Upper Volta. However, with the completion of the new port at Cotonou in Dahomey, the heavier bulk commodities such as cement and petroleum products which now move to the western region of Niger via the port of Abidjan and the Abidjan-Niger Railroad will in all probability be imported via the shorter rail-road route through Dahomey. Also, as new roads are constructed in the economically rich forest zone in the southern half of the Ivory Coast, they tend to drain these regions directly by road to Abidjan. To counteract

¹¹ Information obtained from the files of la Régie Abidjan-Niger.

this attraction, proposals have been advanced for the construction of a direct rail line between the potentially rich region of Man in west-central Ivory Coast and the port of Abidjan, the link passing by way of Daloa and reaching the present-day main line just south of Dimbokro. It is felt that such a rail line would open new areas to wood, coffee, cacao, cola, and oil palm production, and drain virtually all of western Ivory Coast with the exception of the regions adjacent to Sassandra and Tabou and in the northwest corner of the country. It is hoped that funds for this project can be obtained from France through le Fonds d'Aide et de Coopération (F.A.C.) or from the European Economic Community. Dreams of extending the line to Mopti, Ségou, and Bamako in Mali have now virtually been abandoned.

An intensive road building program in the Ivory Coast was first undertaken with the spread of coffee and cacao production to the interior of the colony in the 1920's. By 1938, approximately 15,000 kilometers (9,300 miles) of dirt roads and trails were passable for at least part of the year. Following the close of World War II and through funds made available by France through le Fonds d'Investissement pour le Développement Économique et Sociale des Territoires d'Outre-Mer (F.I.D.E.S.),¹² a road modernization program was undertaken. Its three principal aims were: 1) to tie interior productive regions with the railroad; 2) to tie the productive regions near the coast directly with Abidjan; and 3) to establish direct road connections with neighboring states. By the end of 1961, 32,630 kilometers (20,275 miles) of roads existed in the Ivory Coast, with 12,635 kilometers (7,850 miles) usable the entire year. Of these, 790 kilometers (490 miles) were hard-surfaced. Funds for the

¹² F.A.C. is the successor organization to F.I.D.E.S. The aim of both organizations is (or was) to provide investment capital, mainly from the French budget, for the former French overseas territories.

construction and maintenance of roads in the Ivory Coast are obtained from local and government taxes, F.A.C., gas and oil taxes, and from a special tax on coffee and cacao exports.

Commercial road transportation in the Ivory Coast is in the hands of eleven relatively large companies (the largest of which is the Rothschild-owned Compagnie Transafricaine), approximately 100 small European companies, and many Africans who operate close to 5,000 small trucks. Virtually all banana and pineapple exports are transported directly by truck, their delicate nature precluding unnecessary handling. In addition, over 70 per cent of the coffee and cacao exports move by truck, this high percentage being made possible by keen competition, the low profit margin of African truck owners, and the relative closeness to Abidjan of their main producing regions. Also, most of the palm kernels and some wood move by road, while approximately one-half of the petroleum imports move entirely by tank-truck (see Fig. 8). And finally, note should be made of the importance of the truck as a feeder to the railroad and even to lagoon barge transportation.

The lagoon network is important as a supplier of wood for export to the port of Abidjan. In 1959, a total of 321,737 tons of merchandise were transported by this system. Of this total, 92 per cent consisted of wood moving to Abidjan, the remainder being cement, petroleum products, and miscellaneous goods. Thus, on the basis of 418,746 tons of logs and sawed timber moving overseas from the port of Abidjan in 1959, the lagoon network supplied approximately 70 per cent of the volume of wood embarkations, or approximately 40 per cent of the total volume of port embarkations. Thus, by a process of elimination, motor transportation accounted for approximately 45 per cent of the total volume of embarkations at the port in that year.

LAGOON NETWORK OF SOUTHEASTERN IVORY COAST

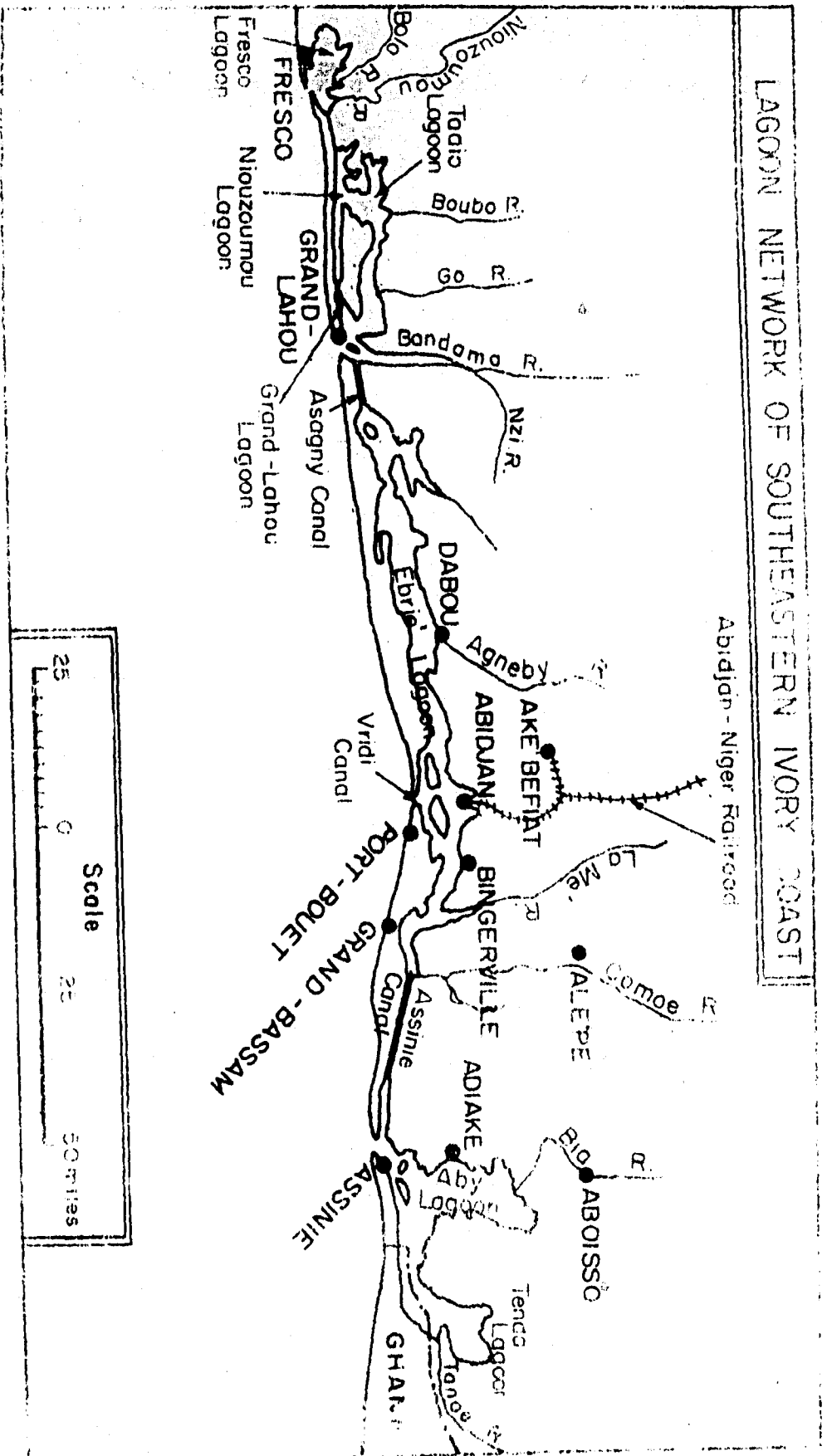


FIGURE 7

The Ivory Coast is endowed with a 180-mile-long lagoon network in the eastern portion of the country, the lagoons averaging one-half mile in width. In the extreme east are the Aby and Tenda lagoons, with the former receiving the Bia River, navigable for 12 miles to the city of Aboisso. This region is fairly rich in coffee, cacao, and wood, being the principal source of mahogany exports. The Aby Lagoon is connected with the Ébrié Lagoon by means of the Assinie Canal. The Ébrié Lagoon receives the Comoé (navigable for 27 miles to Alépé), La Mé, and Agnéby (navigable for 15 miles) rivers. The Ébrié Lagoon is connected with the Grand-Lahou Lagoon by the Asaghy Canal. The Bandama River, navigable for 42 miles as far as Bakanda, enters the Grand-Lahou Lagoon at Grand-Lahou. The Niou-zoumou Lagoon, connected to the Grand-Lahou Lagoon by the Graguinda Canal, rounds out this basic system of lagoons, which has a draft limitation of from one to two meters (see Fig. 7).

Thus, the port of Abidjan, while lacking an inexpensive water route into the interior in the form of a navigable river, is fortunate in possessing a railroad transverse to the major climatic zones of the country, a relatively fine road network, and a system of navigable lagoons. However, should market conditions be favorable and capital available, many new areas of the Ivory Coast could still be opened to commercial agriculture by the expansion of this transportation network.

The Hinterland Behind the Port of Abidjan

The hinterland for which the port of Abidjan has emerged as the principal outlet has been considerably conditioned by political, and not geographical, factors. Trade patterns in former French West Africa developed as parts of a general plan for economic integration of the entire federation, often without regard for natural and more economical

outlets. Thus, Upper Volta, the main body of which is due north of Ghana and between which there are no natural barriers, has been linked by means of the Abidjan-Niger Railroad to the port of Abidjan, through which virtually all of its overseas trade must pass. As a consequence, goods moving to or from the city of Ouagadougou via the railroad and the port of Abidjan must travel some 150-200 miles more than would be necessary if the goods had passed through a more direct route via a port in Ghana. This naturally places an additional burden on the already far from viable economy of that landlocked state. However, a symbolic tearing down of the frontier between Upper Volta and Ghana in 1961 portends a future close economic relationship between these two states. In addition, the Republic of Niger is to a small extent dependent upon the port of Abidjan for the importation of goods too heavy or too costly (such as gasoline) to be debarked at the wharf at Cotonou in Dahomey. However, the use the port of Lagos in Nigeria, the lagoon to Porto-Novo, and the Benin-Niger Railroad has considerably reduced this dependency. With the completion of the new port at Cotonou, this dependency will be completely removed. The southern border region of Mali (particularly the centers of San, Koutiala and Sikasso) also uses the Abidjan-Niger Railroad and the port of Abidjan as the normal evacuation route for its very small exports of peanuts, shea butter, and kapok. And finally, and quite naturally, most of the Ivory Coast, with the exception of the immediate hinterlands behind the wharf at Sassandra and the open roadstands at Tabou, Nero Mer and Grand-Béréby, falls completely within the pull of the port of Abidjan. Thus, in terms of a political definition, the hinterland behind the port of Abidjan includes most of the Ivory Coast and all of Upper Volta. It also normally includes a very small and not very productive area of

Mali, whose influence on the port statistics of Abidjan is virtually nil, and for certain though diminishing imports, the Republic of Niger.¹³ However, in practical terms, it is the Ivory Coast that accounts for virtually all of the commercial activity at the port, since Upper Volta contributes very little in the way of overseas trade.

In terms of basic physical geography, the hinterland consists of a generally uniform, smoothly eroded platform of pre-Cambrian rocks, with limited sedimentary deposition in western Upper Volta and along the eastern coast of the Ivory Coast. The only major region of broken relief is in western Ivory Coast near the centers of Man and Odienné. Climatic-vegetative-soil zones run parallel with the coast, there being two broad zones: the humid equatorial (rainforest) zone and the sudanese (savanna) zone. It is these zones that are the principal conditioners of the nature of the export commodity traffic moving through the port of Abidjan.

The Humid Equatorial Hinterland

The first of these zones (the rainforest) is found in central and southern Ivory Coast and has the usual characteristics associated with such a climatic region: high average yearly temperature with only slight seasonal and diurnal variations, year-round precipitation of over 50 inches, and constantly high humidity. The characteristic vegetation is the tropical rainforest; the zonal soils are the highly leached latosols. Consequently, construction and maintenance of roads and the rail line faced and continue to face the difficulties of penetrating the dense forest and of flooding during the seasons of heavy rain. However, this

¹³ Note should once again be made of the abnormal situation created by the political rift between Senegal and Mali in 1960, the result of which was the diversion of most of the overseas trade of Mali from the port of Dakar to the ports of Abidjan and Conakry. However, normal trade patterns should resume by the end of 1963.

TABLE IV: Analysis of the Value and Volume of the Exports of the Ivory Coast
in 1939, 1948, 1958, and 1960

	<u>1939</u>	<u>1948</u>	<u>1958</u>	<u>1960</u>
<u>Value</u>				
Coffee	88,307	2,501,760	18,780	18,680
Cacao	138,411	1,530,553	6,415	8,714
Wood	21,214	286,504	3,316	6,342
Bananas	15,448	192,123	1,274	1,273
Palm Kernels	7,276	158,313	390	582
Diamonds	-	545	315	342
Pineapples	54	6,906	184	319
Other Products	58,065	520,233	818	1,077
TOTAL	328,775	5,196,937	31,492	37,329
<u>Volume</u>				
Wood	42,845	73,093	402,178	654,824
Coffee	17,961	55,391	112,505	147,488
Bananas	14,286	13,447	46,129	72,619
Cacao	55,185	41,220	46,333	62,871
Palm Kernels	7,228	8,513	17,255	16,354
Pineapples	31	363	3,530	6,735
Other Products	36,053	31,515	22,414	40,606
TOTAL	173,589	223,542	650,344	1,001,497

Note: 1) 1939 and 1948 value figures are given in 1,000 French francs. In 1939, approximately 37.69 francs equaled one U.S. dollar. In 1948, 214.392 francs equaled one U.S. dollar.

2) 1958 and 1960 value figures are given in 1,000,000 francs CFA. In both years 245 francs CFA equaled one U.S. dollar.

3) Volume figures are given in metric tons.

4) In 1961, the above table was substantially modified by the export of 113,728 tons of manganese ore.

TABLE IV - Continued

- Sources: a) Gouvernement Général de l'Afrique Occidentale Française, Statistiques Mensuelles du Commerce Extérieur de l'Afrique Occidentale Française. Commerce Spécial. Importations: Exportations, Décembre 1939 (Gorée: Imprimerie du Gouvernement Général, 1940), pp. 76-111.
- b) Gouvernement Général de l'Afrique Occidentale Française, Statistiques du Commerce Extérieur de l'Afrique Occidentale Française. Commerce Spécial. Importations: Exportations, Année 1948 (Rufisque: Imprimerie du Gouvernement Général, 1949), pp. 68-99.
- c) Chambre de Commerce et Chambre d'Agriculture et d'Industrie, L'Essor Économique de la Côte d'Ivoire (1 Août 1961), p. 263.

zone is by all odds the most important hinterland of the port of Abidjan, and normally accounts for well over 90 per cent of the volume and value of embarkations at the port. All of the wood, coffee, cacao, bananas, palm kernels, pineapples, and cola nuts passing through the port originate in this zone.

In terms of volume, though not in value, as has been noted, wood is the most important commodity passing through the port of Abidjan. In 1960, tropical wood exports from the Ivory Coast amounted to 6.3 billion francs CFA (25.9 million dollars), or 17 per cent of the value of the country's total exports (see Table IV). In that same year, wood from the Ivory Coast found a market in 36 countries, the principal takers being, in order, France, West Germany, Netherlands, Italy, the United States, the United Kingdom, Belgium, and Denmark. The principal competition to the Ivory Coast in the European market comes from Nigeria and Ghana, both of whom can undersell competitive species by as much as 15 per cent and which, quite naturally, are the main suppliers of British needs. In 1952, competition became so severe and so much of the market was lost by the Ivory Coast (production dropped to 75,000 tons) that direct government intervention in the form of lowered export taxes, subsidization of wood transportation, and lowered duties on wood exploitation material was necessary. By 1960, production had risen to well over 650,000 tons, with no end to the boom in sight. Fortunately for the Ivory Coast, most of her European market lies within the European Economic Community, and most severe competition in the future will probably come from those states associated with that community, especially Gabon and Cameroon. Over 25 species are commercialized in the Ivory Coast, with samba, sipo, mahogany, baku, and niangon accounting for over 70 per cent of the total volume cut. With over 80,000 square kilometers (30,000 square miles) of forest capable

of being commercially exploited (of which only 40 per cent is currently open for cutting), the future should present no serious problem as far as reserves are concerned. Most of the embarkations at the port of Abidjan originate near the city in the districts (cercles) of Abidjan, Grand-Bassam, Agboville, Grand-Lahou, and Aboisso, the low value of wood in relation to its volume limiting its cutting at present to areas near the port or within a short or low-cost haulage distance away. Note has already been made of the importance of the lagoons in this respect. Wood also gave rise to the first industries in the Ivory Coast, namely sawmills, of which over 30 are scattered throughout the wood producing region. The two most important centers for sawmilling operations are Abidjan and Grand-Bassam. In 1960, total wood exports included over 23,000 tons of sawed timber, and the recent opening by la Scierie Jacob of a plywood plant at Oumé in the district (cercle) of Gagnoa is bringing even greater diversification in this field. With the best stands of virgin timber located in the thinly populated southwestern region of the Ivory Coast largely untapped, the future calls for the increased development of this region. Lumber companies are now in the process of developing lumber roadsteads west of Sassandra, with three such roadsteads presently in operation: Tabou, Grand-Béréby, and Nero Mer (see infra, pp. 57-59).

Although the extension of coffee cultivation on a large scale was not encouraged until 1930, coffee has grown to become the most valuable export of the Ivory Coast. In 1960, coffee exports, virtually all robusta, amounted to 18.7 billion francs CFA (72.6 million dollars), or 50 per cent of the value of the country's total exports (see Table IV). Over 90 per cent of this coffee found a market in three countries: France, the United States, and Algeria. Coffee is produced throughout the forest zone, with much, if not most, of the soils capable of supporting coffee growth already under



Fig. 8 - Logs being transported by truck, Ivory Coast.

Fig. 9 - Logs awaiting shipment, Banco Bay, Abidjan.



Fig. 10 - Manganese ore awaiting shipment, Manganese Port, Abidjan.

(Photos by R.J.P.)

cultivation. Approximately 98 per cent of the 469,000 hectares (1.2 million acres) devoted to coffee production at the beginning of 1959 were being farmed by African farmers, whose small holdings averaging 5 hectares (12.4 acres) produced a poor average yield of 250 kilograms of coffee per hectare (approximately 220 pounds per acre). By comparison, coffee yields in the Congo (Léopoldville) are often as much as eight times higher. Nevertheless, coffee exports from the Ivory Coast rose from 18,000 tons in 1939, to 55,000 tons in 1948, to 147,488 tons in 1960. With the world coffee market virtually saturated, future expansion of commercial coffee cultivation in the Ivory Coast is very problematical. However, conscious government efforts are being made to increase yields, eradicate coffee plant diseases, improve quality, and stabilize prices. To this end, l'Institut Francais de Café et Cacao (I.F.C.C.) and la Caisse de Stabilisation des Prix du Café have been created. It should also be noted that the Ivory Coast is a signatory to the International Coffee Agreement. And finally, note should be made of the fact that coffee cultivation in the Ivory Coast gave rise to certain industries, all of which are located in Abidjan: three small coffee roasting plants, a coffee sorting and cleaning plant, a coffee bag maker, and the Nestlé instant coffee plant.

Cacao cultivation is also found throughout the forest zone, often sharing a farm with coffee in order to avoid an overdependence on a single commodity. The principal centers for cacao production are the districts (cercles) of Dimbokro, Abengourou, Grand-Bassam, Bondoukou, Grand-Lahou, and Abidjan. As with coffee, virtually all of the cacao production is in the hands of small African farmers, with 99 per cent of the 213,000 hectares (526,000 acres) devoted to its production at the beginning of 1959 in their possession. Unlike coffee, however, cacao production has shown a slight decline in recent years owing to the age of many of the

cacao trees. In addition, low quality, low yield, parasitic diseases (notably the swollen shoot disease), and, until the creation of la Caisse de Stabilisation des Prix du Cacao, fluctuating prices have hindered the development and expansion of this facet of the economy. In 1960, a fairly good crop year, cacao exports amounted to 8.7 billion francs CFA (35.6 million dollars), or 23 per cent of the value of the total exports of the Ivory Coast (see Table IV). With the cacao market tipping strongly in favor of the buyer because of strong competition from Ghana, Nigeria, and Brazil, steps have been taken by the government to increase the quality of cacao production and to force the export of superior beans. It is hoped that association with the European Economic Community will stimulate further cacao culture, since only Cameroon offers any serious competition within this economic bloc. And finally, it should be noted that with the exception of a now defunct cocoa butter factory in Abidjan, cacao production has not given rise to any local industries in the Ivory Coast.

The Ivory Coast littoral presents virtually all of the climatic prerequisites for banana culture: 1) constantly high temperature and humidity; 2) much year-round precipitation; and 3) weak winds. From the introduction of the first plantation in 1932 and the first limited exports to the French market in 1935, banana exports have increased to over 72,000 tons in 1960 with a value of 1.3 billion francs CFA (5.2 million dollars). However, this represents only 3 per cent of the value of the total exports of the Ivory Coast (see Table IV). With the building of the new port at Abidjan and the consequent ease of embarkation, banana exports have shown a steady progression. Owing to its delicate nature, production of this fruit for export is restricted almost entirely to areas within 200 kilometers (approximately 120 miles) of Abidjan (the districts of Abidjan, Grand-Bassam, and Agboville) and to the immediate vicinity of Sassandra. Unlike coffee and

cacao production, commercial banana production has, until very recently, been almost entirely from European owned plantations. However, with the establishment of l'Association pour l'Africanisation de la Culture Bananière et Fruitière en Côte d'Ivoire (A.S.S.A.B.A.F.) in 1959, an effort is being made by the government to encourage production by Africans. Much also has been done to increase the quality of bananas reaching the European consumer, including the creation of la Cooperative Bananière et Fruitière de la Côte d'Ivoire (C.O.B.A.F.R.U.I.T.) and l'Institut Français de Recherches Fruitières Outre-Mer (I.F.A.C.), which together have advanced modern techniques of production, harvesting, and marketing of the fruit. Nevertheless, despite the large increase in world banana consumption, the Ivory Coast has found great difficulty in competing in the international banana market. This is due largely to the severe competition in this field, the fickleness in tastes, and, perhaps above all, the higher prices of the Ivory Coast product. Only through artificial price manipulations have the present-day markets in France, Algeria, and Italy been maintained. Even with the creation of the European Economic Community, the future remains uncertain.

With the creation in 1946 of l'Institut de Recherches pour les Huiles et Oléagineux (I.R.H.O.) and its assumption of the large Station Expérimentale du Palmier à Huile de La Mé, the immense industrial plantation created by l'Union Tropicale de Plantations (U.T.P.) at Dabou, and natural oil palm stands at Grand-Drewin near Sassandra, the feasibility of large-scale oil palm production in the Ivory Coast has been proven. However, with the popularization of coffee and cacao production, the limited native production of the prewar era has not continued, with most exports originating from these organized experimental stations. In 1960, palm kernel exports amounted to 16,354 tons with a value of 582 million francs CFA (2.4 million

dollars) and palm oil and palm kernel oil exports totaled 471 tons with a value of only 27.5 million francs CFA (112.5 thousand dollars). Excluding oil cake (the separate total for palm oil cake is not known), oil palm products accounted for less than 2 per cent of the value of the exports of the Ivory Coast for that year (see Table IV). These experimental plantations plus very limited native production feed the experimental palm oil mills set up on the plantations at La Mé, Dabou, and Grand-Drewin, which have a combined annual capacity of 3,300 tons of oil, and the privately owned mill established in 1950 by l'Huilerie de Palme d'Acobo-Dabou at Dabou. This latter mill has an annual capacity of 3,500-4,000 tons of oil, and sends most of its production to the soap and margarine factories in Abidjan (see supra, p. 32). It exports the palm kernels and uses the oil cake and wastes for fuel. With oil palm production practicable throughout virtually the entire forest zone, with natural oil palm stands on about 700,000 hectares (1.7 million acres), and encouraged by the excellent results obtained by I.R.H.O., the government has undertaken a program of stimulating communal oil palm production. It is felt that the market for this fine quality oil will be virtually unlimited, within as well as outside the Common Market.

The pineapple is the only fruit grown in the Ivory Coast that has given rise to a canning industry. At the end of 1960, only approximately 450 hectares (1,100 acres), most of which were African owned, were devoted to its culture. In that same year, approximately 16,000 tons of the fruit were produced, with most of the production being absorbed by three small canning factories belonging to: 1) la Société Anonyme du Fruit Colonial (C.O.L.F.R.A.) located 15 kilometers (9 miles) north of Abidjan;¹⁴ 2) la

¹⁴ C.O.L.F.R.A. closed down in August 1961. It was succeeded in February 1962 by the Abidjanaise cannery.

Société Africaine de Conserves (S.A.F.C.O.) at Tiassalé; and 3) la Société Alsacienne de la Côte d'Ivoire (S.A.L.C.I.) on Lake Ono northeast of Grand-Bassam. The latter two plants own their own plantations in addition to absorbing private output. In 1960, total exports of canned pineapples, pineapple juice, and fresh pineapples amounted to 6,635 tons with a value of 319.3 million francs CFA (1.3 million dollars). The market was almost entirely in France. Unfortunately, the quality of the Ivory Coast product is not very good, and it finds great difficulty in competing, even in France, with pineapples from Hawaii and the Caribbean region. Even with the association of the Ivory Coast with the European Economic Community the future of this industry is very uncertain.

Note should also be made of the production in this forest zone of the cola nut which grows in the wild state as well as on plantations. Annual production averages around 30,000 tons, most of which is consumed by Africans as a stimulant or hunger suppressant, although it is also used as a flavor base for drinks, in the tanning of leather, and for dyes. In 1960, over 8,000 tons of cola nuts were embarked at the port of Abidjan, virtually all of which were destined for ports within former French West Africa.

Of importance for the future is the reintroduction of rubber to the Ivory Coast. In 1953, la Compagnie Générale Africaine, a former Indo-chinese group, undertook commercial culture of rubber on 400 hectares (almost 1,000 acres) near Bingerville. In 1956, la Société Africaine de Plantation d'Hévéas (S.A.P.H.) received a forest concession of over 30,000 hectares (74,000 acres) in the Comoé Valley west of Lake Ono and near Dabou. In that same year, l'Institut des Recherches sur le Caoutchouc en Afrique (I.R.C.A.) was created to assist in promoting rubber production. With approximately 8,000 hectares (19.7 thousand acres) planted at the end

of 1960, commercial production of rubber is expected to reach 5,000 tons a year in the near future.

And finally, note should be taken of the coconut palm plantations along the sandbar from Assinie to Grand-Lahou. With over over 5,000 hectares (12.4 thousand acres) devoted to coconut palm cultivation, and with the establishment of an I.R.H.O. station at Port-Bouët leading to the increase of yields eight times the world average, the future for copra production in the Ivory Coast is very encouraging.

The Savanna Hinterland

The northern half of the Ivory Coast and all of Upper Volta (with the exception of the semi-arid extreme northern corner) fall within the savanna climatic zone. With a lower total precipitation than the humid equatorial region to the south, with a pronounced seasonality of rainfall, and with a consequent sparser vegetative growth, this zone is incapable of supporting the same type of commercial agriculture that characterizes the forest zone of the Ivory Coast. As an originator of embarkations at the port of Abidjan, this zone ranks very low, accounting in an average year for approximately 2 per cent of the volume and value of such embarkations. In addition to the climatic factor, the factor of distance from the coast acts as an additional inhibitor to the expansion of trade. The embarkations at the port of Abidjan from this zone are limited almost entirely to cotton and cotton derivatives, sesame seeds, shea nuts and shea butter, kapok, sisal, and peanuts and peanut derivatives.

From the earliest days of French penetration of West Africa, cotton was believed to be developable into a major export crop. However, owing largely to poor agricultural methods and poor seed selection, this hope never materialized. In 1959, commercialized cotton production in the

Ivory Coast and Upper Volta (including 600 tons which crossed into Upper Volta from Mali) amounted to approximately 6,800 tons. However, 1959 was a relatively poor cotton year, as over 8,000 tons had been commercialized during the preceding year. All of the cotton is produced on small African holdings, with research and aid being provided by l'Institut de Recherches du Coton et des Textiles Exotiques (I.R.C.T.) and the semi-public Compagnie Française pour le Développement des Fibres Textiles (C.F.D.T.). In addition, la Caisse de Stabilisation des Prix du Coton guarantees the farmer's price. Virtually all of the commercialized cotton passes through the four ginning mills located in this region: 1) C.F.D.T. at Ouagadougou in Upper Volta; 2) C.F.D.T. at Bobo-Dioulasso in Upper Volta; 3) les Établissements Escarre at Korhogo in the Ivory Coast; and 4) la Compagnie de l'Industrie Textile et Cotonnière (C.I.T.E.C.) located at Bouaké in the Ivory Coast. From the ginning mills, the cotton goes largely to the large cotton spinning, weaving, and dyeing plant belonging to les Etablissements R. Gonfreville located three miles north of Bouaké. This is the oldest (founded in 1922) large-scale industrial enterprise in the Ivory Coast, employing approximately 1,200 workers. This factory finds virtually its entire market in the states of former French West Africa, with close to 90 per cent of its output consumed in the Ivory Coast, Upper Volta, and Mali. The ginned cotton that is not locally consumed is exported; in 1960 over 1,000 tons, chiefly from Upper Volta, were shipped to France from the port of Abidjan. Despite the instability of the world cotton market, the future of cotton production in this area is bright, if only by dint of the increasing African market.

Other commercial crops of the savanna zone have a minor effect upon the general economy of the Ivory Coast and Upper Volta. Peanuts, which accounted for 5 per cent of the value of the exports of Upper Volta in



Fig. 11 - A view of
"le Plateau," Abidjan.



Fig. 12 - A young oil
palm plantation, Ivory
Coast.



Fig. 13 - Terminus of
Abidjan-Niger Railroad.
Railroad station,
Ouagadougou, Upper Volta.

(Photos by R.J.P.)

1959, are grown throughout the country. Unfortunately, most of the approximately 50,000 tons produced annually are locally consumed as a subsistence crop, leaving little for export. Some peanuts are also produced near Korhogo in the Ivory Coast, but exports are virtually nil. Sesame (also known as benniseed, tilseed, and gingelly) is produced as a crop at the end of the regular season; sesame oil can be used as a substitute for olive oil. This crop is grown mainly in Upper Volta, and from a total production of over 2,000 tons of seed in 1959, over 1,400 tons were exported via the port of Abidjan. Some also came from Mali. The kernels of the shea butter tree, growing wild throughout the savanna are the source of a valuable oil (or butter). Although its price is guaranteed by la Caisse de Stabilisation des Prix du Karité, annual fluctuations in production, due to weather factors, are great. In 1959, 380 tons of kernels were exported by Upper Volta and 480 tons by the Ivory Coast. Some also moved to Abidjan from Mali. These local sources of oil gave rise to the establishment of an oil and soap factory by C.I.T.E.C. in Bobo-Dioulasso, which processes shea butter kernels, sesame seeds, and peanuts, mainly for local consumption. It has a capacity of 5,400 tons, but is operating well below that figure. Kapok, which also grows wild and whose fiber is exported, is grown in northern Ivory Coast, Upper Volta, and Mali. Its production also varies greatly from year to year. Only 3 tons passed through Abidjan in 1959. Sisal is grown experimentally near Bouaké in the Ivory Coast and by la Société des Cultures de Diakandape near Bobo-Dioulasso. Most of the production is absorbed by la Société de Ficellerie de Bouaké at Bouaké, which in 1959 produced 500 tons of cordage. An additional 74 tons were exported via Abidjan. And finally, mention must be made of les Manufactures des

Tabacs de la Côte d'Ivoire (M.T.C.I.), set up in 1956 at Bouaké. Using local tobacco plus some brought in from Upper Volta, it manufactures approximately 18,000 cases of cigarettes a year.

The Mineral Hinterland

With no mineral production in Upper Volta, and only three relatively minor mineral deposits being exploited in the Ivory Coast, the contribution of mineral production is not very significant at the present time. However, the two governments are undertaking a vast program of geological research, with hopes, if not prospects, running high. In 1959, gold production from several scattered deposits amounted to only 474 grams, which were not exported but used for study in laboratories. In that same year, diamond production amounted to 187,947 carats, virtually all of which were exported to France. With an export value of 373.7 million francs CFA (1.5 million dollars), diamonds ranked in that year as the sixth most valuable export of the Ivory Coast. Two companies are exploiting two deposits of diamonds:

- 1) la Société Anonyme de Recherches et d'Exploitation Minière en Côte d'Ivoire (S.A.R.E.M.C.I.), the largest producer, which is exploiting the deposit at Tortiya, midway between Katiola and Korhogo; and
- 2) la Société Diamantifère de la Côte d'Ivoire (S.O.D.I.A.M.C.I.), which is mining a deposit at Séguéla. In 1959, the former produced 179,327 carats, the latter 8,034, while 588 carats were seized from illegal operators, a serious problem in the Ivory Coast. The third mineral deposit currently being exploited is the manganese ore deposit 60 kilometers (37 miles) northwest of Grand-Lahou, which is being exploited by le Compagnie de Mokta. Reserves are estimated at 13 million tons of ore containing on the average 48 per cent manganese, and evacuation, which began in 1960, is via lagoon and the new mineral wharf at Abidjan. Annual exports of

100,000 tons are envisaged. A "huge" deposit of manganese ore has also been discovered near Korhogo, but distance from the ocean precludes its exploitation at this time. The European Coal and Steel Community has had very little luck in its search for iron ore in the regions of Man, Fresco, and Sassandra. Similarly, la Société Africaine des Pétroles (S.A.P.), associated with the Plymouth Oil Company of the United States, has fruitlessly prospected for oil in the regions of Grand-Bassam and Port-Bouët. In 1959, the Aluminum Company of America (ALCOA) tried and failed to find economically exploitable bauxite deposits near Divo, Lakota, and Bondoukou. Thus, despite indications of various economic mineral deposits, it appears that manganese ore will be the only important tonnage mineral passing through the port of Abidjan in the immediate future.

Secondary Ports of the Ivory Coast

Secondary ports in underdeveloped countries generally tend to develop in regions where the immediate hinterland gives rise to exportable commodities which for economic and/or political reasons cannot or will not be transferred to one of the major existing outlets. This rule holds true in the case of the "port" of Sassandra, and less so in the case of the "ports" of Tabou, Nero Mer, and Grand-Béréby. These latter are actually open roadsteads. Tabou witnessed an early start as an exporter of palm oil, palm kernels, coffee, and cacao. However, owing to the fact that much of the production of its hinterland was subsequently diverted to Liberia, the supply of these products soon diminished, and Tabou was relegated almost solely to the status of a supplier of Kru seamen. The men of this once fierce and cannibalistic tribe are great lovers of the sea and make excellent sailors. Consequently, numerous vessels running down the coast stop at Tabou to pick up extra seamen, dropping them off

TABLE V: Analysis of Traffic at the "Ports" of Sassandra, Tabou, Nero Mer, and Grand-Béréby for 1948, 1958, and 1961

<u>Port</u>	<u>1948</u>	<u>1958</u>	<u>1961</u>
<u>Sassandra</u>			
Number of Ships Entered	145	385	472
Net Registered Tonnage (1,000 tons)	457	1,168	1,554
Merchandise Debarked (tons)	8,280	3,661	4,423
Merchandise Embarked (tons)	13,520	50,086	110,659
Wood	N.A.	38,729	96,000*
Bananas	N.A.	6,747	6,000*
Number of Passengers Debarked	N.A.	259	636
Number of Passengers Embarked	N.A.	697	394
<u>Tabou</u>			
Merchandise Debarked (tons)	268	1,748	2,000*
Merchandise Embarked (tons)	186	152	
<u>Nero Mer</u>			
Merchandise Embarked (tons)	-	-	13,000*
<u>Grand-Béréby</u>			
Merchandise Embarked (tons)	-	-	16,000*

N.A. - Figures are not available.

* Figures are rounded off.

Sources: a) Territoire de la Côte d'Ivoire, Ministère du Plan, Service de la Statistique, Inventaire Économique de la Côte d'Ivoire (1947 à 1956), pp. 169-170.

b) République de Côte d'Ivoire, Ministère des Finances, des Affaires Économiques et du Plan, Direction de la Statistique, des Études Économiques et Démographiques, Bulletin Mensuel de Statistique, 14^e année, No. 6 (Juin 1961), p. 6.

c) République de Côte d'Ivoire, Ministère des Finances, des Affaires Économiques et du Plan, Direction de la Statistique et des Études Économiques et Démographiques, Situation Économique de la Côte d'Ivoire 1961, Juillet 1962, p. 57.

on the return trip. In 1960, 448 vessels called at Tabou, 317 of which were under French registry. 1,765 tons of merchandise were debarked, while 7,357 tons (mainly wood) were embarked. With only a virtually impassable trail leading to Guiglo and Man, Tabou is dependent upon the sea and air for its outside contacts. The hinterland of the roadstead is thus very restricted to its immediate surroundings. For a while, it was believed that Tabou would emerge as the leading outlet for the excellent stands of virgin timber in southwestern Ivory Coast. However, with a rocky coast, a violent surf, and no real protection offered to ships anchored at large, it soon became apparent that the future called for the development of a better site (or sites) as the principal timber outlet(s). In 1960, a move was made in that direction by the selection and use of Nero Mar and Grand-Béréby to the east as wood evacuation points. In 1961, approximately 29,000 tons of tropical timber were evacuated from these roadsteads. With their development, the role of Tabou as a wood evacuation point decreased sharply (see Table V). It appears that Tabou is now destined to remain a small roadstead town (population 3,000), whose principal attraction will continue to be its hardworking men.

Sassandra (population 5,000) is also an important Kru pickup point. However, it has a more productive hinterland, more exports, a good road connection with Gagnoa, Tiassalé and Abidjan, and perhaps above all, a relatively fine "port." This latter consists of a semi-circular bay protected from the coastal drift by a rocky promontory to the west, thus providing sheltered anchorage for ships drawing up to 11 meters. An illuminated wharf was constructed in this bay in 1951, to which ships anchored at large are connected by lighters. Five cranes (one

30-ton, one 20-ton, and three 5-ton) perform the loading and unloading functions at the wharf, at the land end of which are two warehouses with a combined covered area of 1,400 meters. The port is connected with its limited hinterland solely by means of roads. In 1961, 472 ships called at the "port" and debarked 4,423 tons of merchandise. In return, 110,659 tons of merchandise, chiefly wood (96,000 tons) and bananas (6,000 tons), were embarked (see Table V). In addition to the small 500-ton capacity palm oil mill at the I.R.H.O. experimental station located 12 kilometers (7 miles) from Sassandra at Grand-Drewin, industry at Sassandra is represented by a small lemon essence factory which exports approximately 10 tons of essence a year, chiefly to the French perfume center at Grasse. A second small lemon essence factory is located at Dabakala. It is very unlikely that Sassandra will develop as a serious competitor to the port of Abidjan, although in its own right it can develop as an important secondary port of the Ivory Coast. In 1961, Sassandra accounted for only approximately 5 per cent of the volume of embarkations and debarkations in the Ivory Coast. While the site of the port is a relatively good one for the western coast, it is not basically a good one. In addition, the districts (cercles) of Tabou and Sassandra are very sparsely populated. These facts coupled with the fact that the Sassandra River is not navigable predicates against the emergence of the port of Sassandra as anything more than a minor complimentary port to the major Ivory Coast port of Abidjan.

Conclusion

Of the eight territories (and subsequently states) of former French West Africa, the Ivory Coast has perhaps the best basic potential for economic development. In terms of location, the country lies in the

commercially productive West African rainforest and savanna, with the consequent diversity of agricultural production. In terms of specific commodities, the climatic base is well suited for the production of coffee, cacao, bananas, oil palm, coconut palm, pineapples, rubber, cola nuts, cotton peanuts, and other commercially important crops, as well as the exploitation of tropical timber stands. In this respect, the Ivory Coast is very similar to the states of Ghana and Nigeria, and totally unlike Senegal. The latter, although more strategically located, lies almost entirely within the savanna and steppic zones of West Africa and has virtually a mono-agricultural base - the commercial exploitation of the peanut. Also, unlike Guinea, the Ivory Coast is a relatively flat country with few physiographic limitations to the expansion of commercial agriculture and transportation, though, to be sure, the Ivory Coast apparently does not have the mineral potential of her neighbor to the west. Unfortunately, however, this very fine potential of the Ivory Coast remained for decades in a state of virtual asphyxiation, a state brought about by the lack of an economical deep-water outlet. This, in turn, was conditioned by the nature of the straight, unindented coastline of the country, a coastline not lending itself well to port development.

In 1950, the Vridi Canal was completed, and the Ébrié Lagoon near the city of Abidjan was opened to deep-draft navigation. With it and the subsequent construction of the well-sheltered port of Abidjan came a remarkable upsurge in the economic development of the Ivory Coast, a development which has continued unabated to the present day. The construction of the port of Abidjan was the key that unlocked the door to this very promising future.

What the future holds for the port of Abidjan is bright but somewhat problematical. It is very unlikely that the port will ever drain more of a hinterland than it does at present; it is very likely that with the removal of political and economic barriers in West Africa and with the con-

struction of new ports, the areal extent of the present-day hinterland will diminish. The construction of the new port at Cotonou in Dahomey will have the effect of diverting the present-day limited inflow of heavy and bulk commodities to western Niger via the port of Abidjan to Cotonou. Similarly, the new port at Cotonou will exert a stronger pull on eastern Upper Volta, presently almost entirely within the hinterland of the port of Abidjan. Note should be made of the fact that in the case of landlocked Upper Volta and Niger the choice between Cotonou or Abidjan will be based almost entirely on economic factors, since Upper Volta, Niger, Dahomey, and the Ivory Coast have coordinated their economies by the formation of the Council of the Entente (Conseil de l'Entente). A more uncertain question is the future relationship between Upper Volta and Ghana. Should the barrier between these two states actually be removed (a symbolic tearing down of the frontier occurred in 1961), the future will probably witness a flow of goods between Upper Volta and the Ghanaian ports of Takoradi and Tema. However, whatever the future modification of the existing commodity flow pattern in this region of West Africa, the port of Abidjan will continue to service most of the Ivory Coast, western Upper Volta, and portions of neighboring Mali, the hinterland from which almost all of the embarkations at the port originate today. With a fine man-made harbor and port, a very productive hinterland, a diverse economic base ameliorating possible fluctuations in the market price of any single commodity, and association with the European Economic Community (with which most of her foreign trade is carried on), the future bodes very bright for the economy of the Ivory Coast and for the port of Abidjan.

Sources

1. Chambre de Commerce et Chambre d'Agriculture et d'Industrie. L'Essor Économique de la Côte d'Ivoire. Abidjan, 1 Août 1961.
2. La Documentation Française. "La République de Côte d'Ivoire," Notes et Études Documentaires, No. 2,588 (7 Novembre 1959).
3. Territoire de la Côte d'Ivoire, Ministère du Plan, Service de la Statistique. Inventaire Économique de la Côte d'Ivoire (1947 à 1956). Abidjan, 1958.
4. République de Côte d'Ivoire, Ministère des Finances, des Affaires Économiques et du Plan, Service de la Statistique. Inventaire Économique et Social de la Côte d'Ivoire 1958. Abidjan, 1960.
5. République de Côte d'Ivoire, Ministère des Finances, des Affaires Économiques et du Plan, Direction de la Statistique, des Études Économiques et Démographiques. Bulletin Mensuel de Statistique. 14^e Année, No. 6 (Juin 1961).
6. Gouvernement Général de l'Afrique Occidentale Française. Statistiques Mensuelles du Commerce Extérieur de l'Afrique Occidentale Française, Commerce Spécial. Importations: Exportations. Décembre 1939 (Gorée: Imprimerie du Gouvernement Général, 1940).
7. Gouvernement Général de l'Afrique Occidentale Française. Statistiques du Commerce Extérieur de l'Afrique Occidentale Française, Commerce Spécial. Importations: Exportations. Année 1948 (Rufisque: Imprimerie du Gouvernement Général, 1949).
8. République de Côte d'Ivoire, Ministère des Finances, des Affaires Économiques et du Plan, Direction de la Statistique et des Études Économiques et Démographiques. Situation Économique de la Côte d'Ivoire 1961. Abidjan, Juillet 1962.
9. Rougerie, Gabriel. "Le Port d'Abidjan," Bulletin de l'Institut Français d'Afrique Noire, Tome XII, No. 3 (Juillet 1950).
10. Boissin, René. République de Côte d'Ivoire. Abidjan: Revue Encyclopédique de l'Afrique, 1960.

11. République de Côte d'Ivoire, Ministère des Travaux Publics, des Transports et des Postes et Télécommunications. Port d'Abidjan: Rapport Annuel 1959. Abidjan, 1960.
12. "Côte d'Ivoire 1959," Marchés Tropicaux et Méditerranéens, 15^e Année, No. 701 (Samedi 18 Avril 1959), 912-1045.
13. "La Côte d'Ivoire 1962," Europe Outremer, 39^e Année, No. 389 (Juillet 1962), 21-73.
14. République de Côte d'Ivoire, Service de l'Information. Le Port d'Abidjan. Abidjan, Septembre 1958. (Mimeographed.)
15. Laboratoire de Géographie de l'Université de Strasbourg sous la Direction du Professeur J. Tricart. Étude Géographique des Problèmes de Transports en Côte d'Ivoire. Abidjan: Territoire de la Côte d'Ivoire, Direction des Travaux Publics, Bureau Central d'Études pour les Équipements d'Outre-Mer, 1955/1956.
16. Richard-Molard, Jacques. Afrique Occidentale Française. 3rd. ed. revised. Paris: Éditions Berger-Levrault, 1956.
17. Avice, Emmanuel. La Côte d'Ivoire. Paris: Société d'Éditions Géographiques, Maritimes et Coloniales, 1951.
18. Brasseur, G. L'A.O.F. Dakar: Institut Français d'Afrique Noire, 1957.
19. Personal interviews and field work in the Ivory Coast, Upper Volta, Mali, and Niger.